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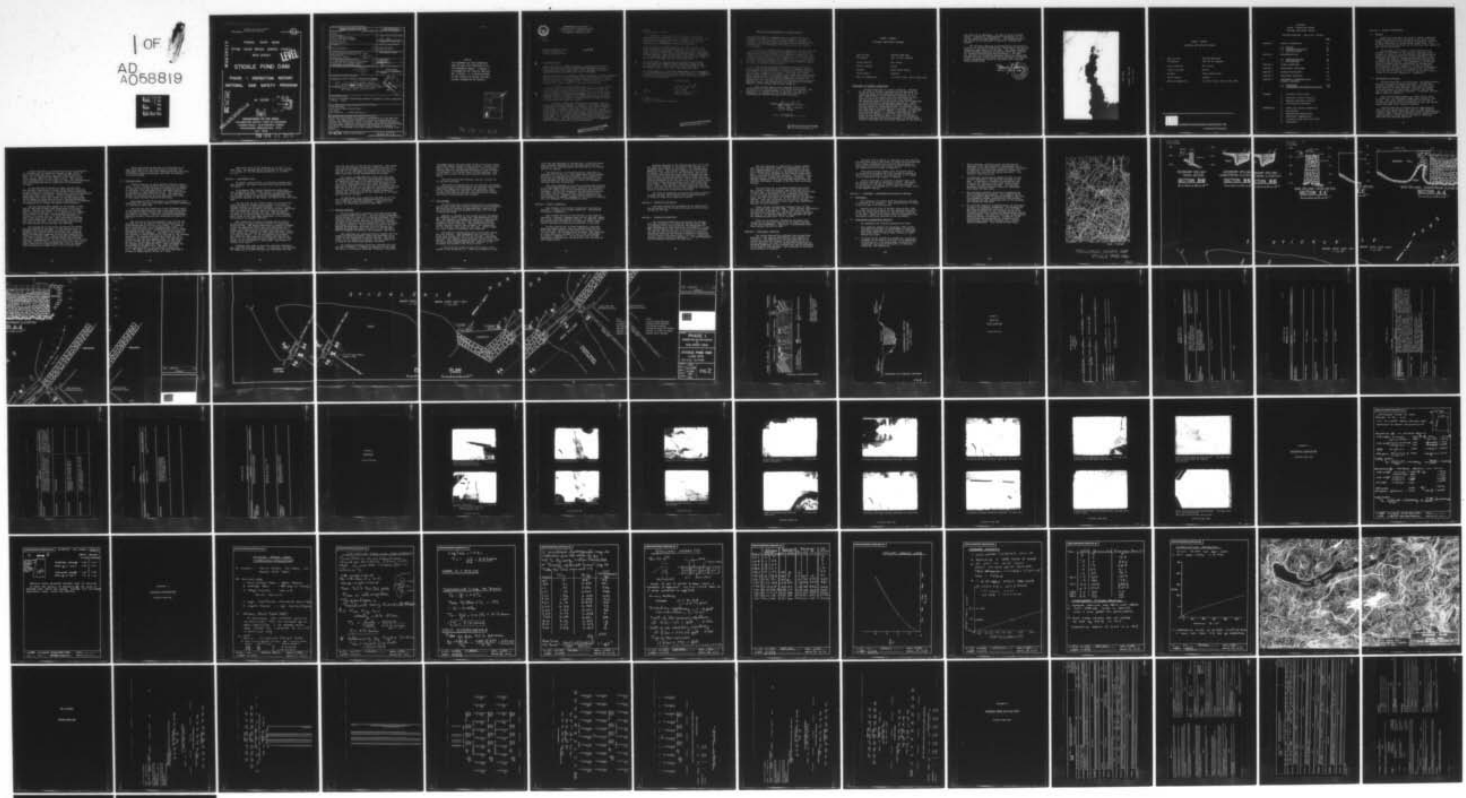

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PASSAIC RIVER BASIN

STONE HOUSE BROOK, MORRIS COUNTY

NEW JERSEY

LEVEL

STICKLE POND DAM

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

NJ 00285

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

JULY 1978

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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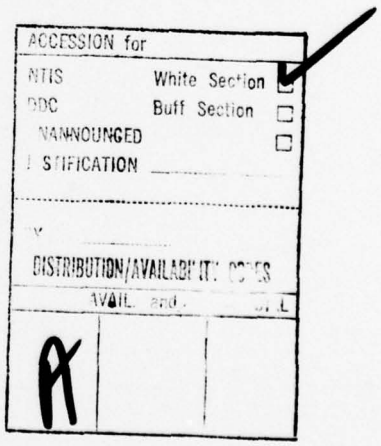

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE--2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

31 AUG 1978

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report fo. Stickle Pond Dam in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given on the first three pages of the report.

Based on visual inspection, available records, calculations and past operational performance, Stickle Pond Dam is judged to be in poor condition. The dam's spillway is considered seriously inadequate since 3 percent of the Probable Maximum Flood (PMF) would overtop the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by the owner employing a qualified consultant using more sophisticated methods, procedures and studies within six months from the date of approval of this report. Any remedial measures necessary to insure adequacy of the spillway and prevent overtopping should be initiated within calendar year 1979. In the interim a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. As seepage (several small whirlpools) was observed through the surface of the upstream embankment of the dam at the spillway, subsurface investigations and studies of this area should be made within six months from the date of approval of this report. At the same time, studies should be made to ascertain the effects of the existing steel pipes through and/or beneath the dam. As an interim measure, a sand and gravel inverted filter overlain by a PVC liner should be immediately placed over the problem area. This treatment will decrease the present seepage and prevent additional losses. Also, the spillway's stop logs should be immediately removed to further decrease head and piping potential.

c. Within one year from the date of approval of this report, provisions for the installation of a bottom outlet should be made. This will provide for controlled drawdown of the pond in the event of an emergency or for remedial work. At the same time, provisions for strengthening the secondary spillway should be initiated.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congresswoman Helen S. Meyner of the Thirteenth District. Under the provisions of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, thirty days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia, 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely yours,

James G. Ton

1 Incl
As stated

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

Cy furn:
Mr. Dirk C. Hofman, P.E.
Department of Environmental Protection

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

Based on visual inspection, available records, calculations and past operational performance, Stickle Pond Dam is judged to be in poor condition. The dam's spillway is considered seriously inadequate since 3 percent of the Probable Maximum Flood (PMF) would overtop the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

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APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 31 Aug 78

PHASE 1 REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	STICKLE POND DAM
ID Numbers	Fed. ID No. NJ00285
State Located:	New Jersey
County Located:	Morris
Stream:	Stone House Brook
River Basin:	Passaic
Date of Inspection:	5,7,12,27 June, and 12 July 1978

ASSESSMENT OF GENERAL CONDITIONS

Stickle Pond Dam is in poor condition. Because of the lack of design, construction and operation information there is considerable uncertainty as to the future performance of the spillway sections of the dam. There is an urgent need to investigate the subsurface conditions upstream of the main spillway. The temporary measure of providing a PVC lining upstream of the dam should be implemented immediately. Where possible existing voids and depressions upstream of the dam should be investigated and, if necessary, have sand and gravel inverted filters installed. In addition, the stop-logs should be removed to decrease the gradient and piping potential. A complete investigation and study of the affects of the steel pipes through or below the dam should be made. If required, permanent remedial measures should be developed. A bottom outlet should be provided for controlled drawdown of the pond in

the event of an emergency. If such an outlet already exists it should be investigated to determine its location, condition and capability. The secondary spillway should be strengthened by means of a downstream support.

The spillway capacity as determined by CE screening criteria is seriously inadequate. We estimate the dam can adequately pass only 2% of the PMF. The actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures. The need for and type of mitigating measures should be determined. Around the clock surveillance during periods of unusually heavy precipitation should be provided, and a warning system established.

Dennis J. Leary, P.E. 17546

STATE OF NEW JERSEY
LICENSED
PROFESSIONAL ENGINEER

OVER VIEW

STICKLE POND DAM

21 June 1978

PHASE 1 REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	STICKLE POND DAM
ID Numbers	Fed. ID No. NJ00285
State Located:	New Jersey
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Stream:	Stone House Brook
River Basin:	Passaic
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LANGAN ENGINEERING ASSOCIATES, INC.

Consulting Civil Engineers

CONTENTS

PHASE 1 INSPECTION REPORT

NATIONAL DAM SAFETY REPORT

STICKLE POND DAM FED ID NO. NJ00285

SECTION 1 PROJECT INFORMATION

1.1 General

Authority to perform the Phase I safety inspection of Stickle Pond Dam was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 26 May 1978. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367.

The purpose of the Phase I investigation is to develop an assessment of the general conditions with respect to safety of Stickle Pond Dam and appurtenances based upon available data and visual inspection, and, determine any need for emergency measures and conclude if additional studies, investigations and analyses are necessary and warranted. The assessment is to be made using screening criteria established in Recommended Guidelines for Safety Inspection of Dams prepared by the Department of Army, Office of the Chief of Engineers. It is not the purpose of the inspection to imply that a dam meeting or failing to meet the screening criteria, is per se, certainly adequate or inadequate.

1.2 Description of Project

Stickle Pond Dam is a 100-ft-long, 16-ft-high masonry dam with a free-fall masonry spillway. In addition, a small secondary free-fall spillway is located about 60-ft west of the main spillway. The dam is located in Morris County at Smoke Rise, Kinnelon, New Jersey, and is used for recreation purposes. A regional vicinity map is given as Figure 1.

The dam and appurtenances are owned by Mr. John A. Talbot, Jr. of Clotswood, Smoke Rise, Kinnelon, New Jersey. The owner reports the purpose of the dam is to increase the level of the pond by two feet and thereby enable the pond to be used for boating.

Stickle Pond has a surface area of approximately 125 acres and north-south axis which is approximately 5,000-ft long and an east-west axis which is approximately 1,000-ft wide. The dam is located on the easterly shore line towards the south end of the pond at longitude 74°24'30" and latitude 40°59'17".

Stickle Pond Dam is classified as being "Intermediate" on the basis of its reservoir storage volume, which is more than 1,000-acre feet, but less than 50,000 acre feet. It is classified as "Small" on the basis of its total height, which is less than 40 feet. The overall size classification is the larger of these two determinations, and accordingly the dam is classified as"Intermediate" in size.

In the National Inventory of Dams, Stickle Pond Dam has been classified as having "High Hazard Potential" on the basis that failure of the dam would cause excessive property damage to residences downstream, and could potentially cause more than a few deaths. Visual inspection of the downstream area shows that breach of the dam would cause little damage to structures which are located downstream but could be hazardous to more than a few people. Accordingly, we proposed not to change the Hazard Classification.

The dam and spillways appear to be founded on rock and are believed to have been constructed in the early 1900's. The main spillway is 16-ft-high, 25-ft-long, and 8-ft-wide at the crest. It is located at the approximate center of the dam. The secondary spillway is 4-ft-high, 6-ft-long, and 2.1-ft-wide and located in a small inlet west of the dam. Both spillways discharge into Stone House Brook that feeds Butler reservoir one mile east of the dam. At least two pipes pass through the left portion of the dam near the spillway.

No information is available concerning the design, and construction of the dam. It was reported that in November 1977 vortexes(small whirlpools)were noted immediately upstream of the spillway and right abutment. These vortexes were reported to have been repaired and reoccured in March 1978. Langan Engineering Associates Inc., were engaged to observe the conditions and make remedial recommendations. As of 27 June 1978, two vortexes have been covered, one with polyvinal held in place with large rocks and the other filled with 1-1/2 in. stone; small vortexes are present next to the covered areas.

Normal operation of the dam is to maintain 6-in-high stop-logs in the spillway crest to provide for additional reservoir level and thereby minimize collision of pleasure craft with shallow rock that is reported to be in the pond.

1.3 Pertinent Data

Stickle Pond has an approximately 1700 acre watershed. It has a shape which is short and wide as opposed to long and narrow and in general conforms to the shape of the pond. The watershed has a maximum difference in elevation of approximately 300 ft. The slope of the ground surface varies from 5% to 20%. The watershed drains in a general west to east direction with three to four small streams feeding Stickle Pond.

Approximately 75% of the basin is undeveloped woodlands with the remaining 25% being single family residences on relatively large lots.

The location and elevations of the different parts of the dam and appurtenances have been obtained by means of surveyors transit and rod and a reference elevation provided by the owner. They are considered approximate. Essential project features and elevations are given in Fig. 2.

The portion of the dam located to the left of the spillway is a 45-ft-long, 4.5-ft-wide masonry wall located downstream of an earth fill slope. It forms an earth retaining wall at an abandoned bath house. It has a vertical face with a maximum height of 9-ft above downstream ground level. It is likely this portion of the dam has a rock abutment. The dam at the right of the spillway is 30-ft-long and 6.5-ft-wide at its thinnest location. No seepage was observed through the left portion of the dam and seepage, about 0.2 gpm was observed through the face and lower part of the right portion of the dam near the masonry-rock interface. All seepage water appeared clean. Both spillways are constructed of masonry rock. The depth of water at the upstream face of the spillway is about one foot. The depth is estimated to increase upstream at a slope of approximately 10 hor to 1 vert.

The water level of the pond was at el 791.7 on 12 June 1978. The stream bed at centerline of the spillway is at about el 770 and maximum tailwater is at about el 774.

SECTION 2 ENGINEERING DATA

No design, construction, or operating records have been located. The owner believes such information does not exist.

On 16 March 1978, Langan Engineering Associates, Inc. inspected the dam at the request of representatives of the Smoke Rise Club. A report was prepared giving the results of their findings and recommendations. The significant aspects of the report are given on the following page.

"At the time of our initial visit, a circular void about one foot in diameter was visible at the earth surface adjacent to the right abutment. A 1 to 2 inch diameter vortex had formed at the water surface indicating that a substantial flow of water was passing through the void, and then through the dam. Some seepage at the base of the downstream face could be seen although heavy rains at the time made evaluation of the quantity and location of seepage difficult.

This condition is known as piping and it occurs on dams where no positive water cutoff is constructed below the dam. The piping mechanism is caused by seepage forces and generally starts near the downstream toe of a dam. As erosion of soil and deterioration of rock takes place, the velocity of water flow increases. With time, sufficient erosion can take place such that failure of a dam can result. It is not possible to estimate the length of time required to produce detrimental effects. It is relatively certain, however, that if such piping is not eliminated or controlled, some degree of failure will occur."

Attempts were made to seal the void with bentonite and cover the void with plastic. In addition, the spillway was temporarily blocked and dye was introduced into the

void and the base of the dam was inspected. The inspection revealed seepage occurring at four locations at the base of the dam with an estimated flow of 30 to 50 gpm and it was concluded that piping was occuring at other locations on the upstream side of the dam.

The report recommended both short and long term remedial measures. The short term measures consisted of immediate placement of an approximately 40 ft by 70 ft, 20-mil-thick impervious PVC lining upstream of the dam; daily inspection of the dam area; and weekly inspection of the base of the dam with the spillway blocked. The long term solution consisted of subsurface investigation and design of a permanent piping prevention system, and, an evaluation of the stability of the spillway section of the dam.

An additional site inspection was made on 12 July. This inspection included representatives of the N.J. D.E.P. and The Corps of Engineers. Conditions were similar to those observed on 27 June 1978.

2.1 Regional Geology

Stickle Pond Dam is located in the New Jersey Highlands physiographic province. The New Jersey Highlands extend across the state in a northeast-southwest direction from the border of New York to the Delaware River and includes the northwest portions of Hunterdon, Passaic, and Morris Counties and the southeastern parts of Warren and Sussex Counties. This province is part of the New England Physiographic Province and lies between the Appalacian Ridge and Valley Province to the northwest and the Piedmont Province to the southeast. See Fig 3.

The Highlands are characterized by rounded and flat-topped northeast-southwest ridges and mountains up to 1,400 ft high separated by narrow valleys. The orientation of the valleys are usually, but not always controlled by the underlying geologic structure.

The regional geologic structure reflects the very old age of bedrock. A number of regional faults cross the area in a northeast southwest direction, including

the Ramapo Fault; the more than 30 mile long fault scarp forms the eastern border of the province. Faults control many of the river valley orientations. The relatively uniform slope of the mountain elevations, from northwest to southeast, is a direct result of the faulting. The entire area is part of the now dissected Schooley Peneplain.

The Pleistocene Age Wisconsin glacier covered all of the dam site area.

The glacier stripped most of the existing overburden and weathered rock and uncovered the numerous hard bedrock knobs and ridges seen throughout the province. Most of the side-slopes in the area are covered with heavy boulder tills (ground moraine), whereas glacial outwash and recent alluvium cover the valleys.

2.2 Site Geology

Stickle Pond Dam is constructed across a relatively narrow rock gorge with bedrock exposures at both abutments. The spillway is located at approximately elevation 791 while the mountains surrounding the lake rise to 4,000 ft above sea level.

Bedrock is exposed at the ground surface throughout the reservoir area, the dam site, and downstream of the dam. The bedrock is composed of medium to large grains of quartz and feldspar with some indistinct gneissic banding of darker minerals. The predominance of the ligher minerals (quartz and feldspar) are responsible for the overall light color of the rock. Quartz seams up to two inches in thickness were observed.

Two distinct discontinuity sets can be seen in the dam site bedrock. The predominant set strikes N 20° E and dips between 20° and 30° to the east - southeast. This joint set appears to be along the foliation of the bedrock. The second prevailing joint set is a high joint set which dips between 80° and 90°; usually to the southwest and strikes N 50° W to N 70° W.

A less distinct joint set may exist that is conjugate to the foliation set. While no evidence of this

joint set was observed at the dam site, a few high angle rock surfaces conjugate to the primary joint set and dipping to the west-northwest was observed on the ground and in air photos.

The combination of discontinuities, typically on spacings of 2 ft to 5 ft, are responsible for the blocky nature of the exposed rock surfaces. This combination of joints is responsible for the ravine located on the right abutment of the spillway in which the secondary spillway has been constructed.

The right abutment of the dam is constructed directly on a large exposed bedrock knob. Bedrock can be observed across the right half of the foundation of the dam and spillway. On the left abutment, the dam-bedrock contact is hidden from view by a masonry channel wall and upstream soil fill. However, the close proximity of the left abutment to bedrock exposed in the reservoir suggests the left abutment is also founded on rock.

SECTION 3 VISUAL INSPECTION

The results of the visual inspection are given in Appendix 1, Check List Visual Inspection. Photographs are given in Appendix 2.

The overall quality of the bedrock in the area is excellent. However, seepage water can be observed coming out of the structure-bedrock contact. In addition, small whirlpools were observed in the reservoir above these leaks, indicating a hydraulic connection to the pond.

At the time of our 12 June inspection, two void areas had been treated. One was covered with PVC and held down with stones and the other was filled with 1 1/2 in. stone. No vortexes were observed. The locations of these areas are included in Fig. 2 and photographs are given in Appendix 2. At the time of our 27 June inspection, vortexes were observed near the locations of the treated areas.

Seepage observed at the downstream face of the dam was small and seepage at the base of the spillway is estimated to be about 30 to 40 gpm. All seepage water appeared clean. Our primary concerns are the evidence of piping, the stability of the spillways, and the uncertainty concerning the pipes passing through the dam. The presence of upstream voids where attempts had been made to plug them were observed. These voids have been treated surfacially and are believed to still exist along with other voids whose presence is not observable from the surface. The secondary spillway which is located 60 ft west of the dam has a slight downstream bow and has a very thin cross section with respect to its height which is indicative of marginal stability.

The lack of knowledge concerning the pipes, passing through the dam, particularly their condition within or below the dam is an important concern.

SECTION 4 OPERATION PROCEDURES

The only operational procedure we are aware of is the maintenance of 6-in-high stop-logs in the spillway section of the dam.

SECTION 5 HYDRAULIC/HYDROLOGIC

The hydraulic/hydrologic evaluation for Stickle Pond Dam is based on the probable maximum flood (PMF) in accordance with the evaluation and guidelines for dams classified as high hazard and intermediate in size. The original design data for this dam is not available. The PMF has been determined by developing a synthetic hydrograph based on the maximum probable precipitation of 22.5 inches (200 square mile - 24 hour). Hydrologic computations are given in Appendix 4. The PMF determined for the subject watershed is 6,800 cfs.

The main spillway is essentially a broad crested weir with an effective length of approximately 22 ft and a maximum depth of 2 ft. The spillway is spanned by a walkway which divides the spillway into four area ways. It has been designed so that boards (stop-logs) can be inserted in the four openings. Currently 6 inch high boards are located across the main spillway. The maximum capacity of the main spillway varies from 130 cfs with the boards in place to 200 cfs with the boards removed.

The pond also has a secondary dam/spillway which has a crest elevation slightly lower than the top of the main dam. The relationship of the spillway elevations is that the top elevation of the secondary spillway is 0.3 ft above the boards and approximately one foot lower than the elevations of the main dam at the spillway section. Also the elevations of the top of the main dam vary with some portions being lower than immediately adjacent to main spillway.

Flood routing calculations indicate that the dam will overtop under the SDF (PMF). Flood routing calculations are included in Appendix 4. Water will flow over the secondary spillway and over dam before the main spillway can flow at its maximum capacity. We estimate the dam can adequately pass only 2% of the PMF.

There is no specific information available with regard to the size and function of the pipes reported in the left embankment. Therefore, a preliminary drawdown analysis can not be made.

SECTION 6 STRUCTURAL STABILITY

Our visual observations indicate the non-spillway portions of the dam are satisfactory with respect to stability. The stability of the main spillway is uncertain particularly because of the piping action occuring upstream, the lack of information concerning the upstream dimensions of the spillway and uplift pressures on the base of the spillway. The stability of the secondary spillway is marginal.

Analyses of the degree of stability of both spillway sections were made on the basis of simplifying assumptions. Until these assumptions are verified the analyses is considered to indicate potentially unstable conditions. The computations are given in Appendix 3.

Post construction changes have consisted mainly of the surface treatment of voids created by piping of the backfill upstream of the spillway and it is judged to be ineffective with respect to piping.

Stickle Pond Dam is located in Seismic Zone 1 of the Seismic Zone Map of Contiguous States. The degree of stability of the dam is unknown and conventional safety margins are assumed not to exist for either static or earthquake loading.

SECTION 7 ASSESSMENT, RECOMMENDATION/REMEDIAL MEASURES

7.1 Assessment

The adequacy of Stickle Pond Dam spillway sections is believed to be marginal. This determination is based primarily upon site observations.

Because of the lack of design, construction, and operation information there is considerable uncertainty as to the future performance of the spillway sections of the dam. There is an urgent need to investigate the subsurface conditions upstream of the spillways.

7.2 Recommendations/Remedial Measures

We recommend the following measures be taken.

1. The temporary measure of providing a PVC lining upstream of the dam, as recommended by Langan Engineering Associates in their report to the Smoke Rise Club, dated 17 March 1978, should be implemented very soon.

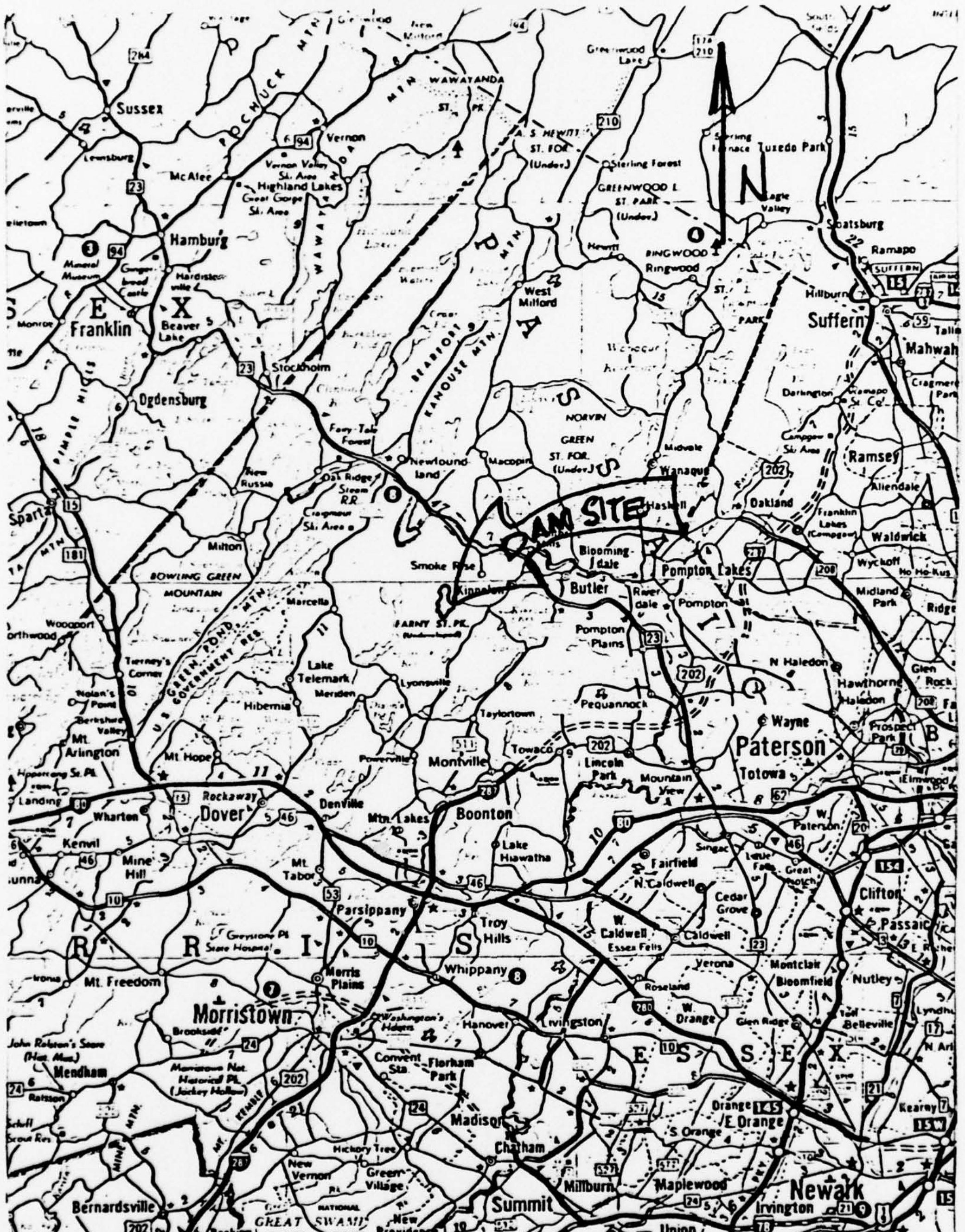
2. A bottom outlet should be provided for controlled drawdown of the pond in the event of an emergency. If such an outlet already exists it should be investigated very soon to determine its location, condition, and capability.

3. Where possible, existing voids and depressions upstream of the dam should be investigated and if necessary have sand gravel inverted filters installed. In addition, the stop-logs should be removed to decrease the gradient and piping potential. This should be done very soon.

4. A subsurface investigation should be made of conditions upstream of the spillway sections of the dam. In addition, a complete investigation and study of the affects of the steel pipes through or below the dam should be made. If required, permanent remedial measures should be developed. This should be done soon.

5. The secondary spillway should be strengthened by means of downstream support. This support could be provided by means of Gabions pinned to the rock with permanent wedges inserted and fixed between the Gabions and the downstream face of the spillway. This should be done soon.

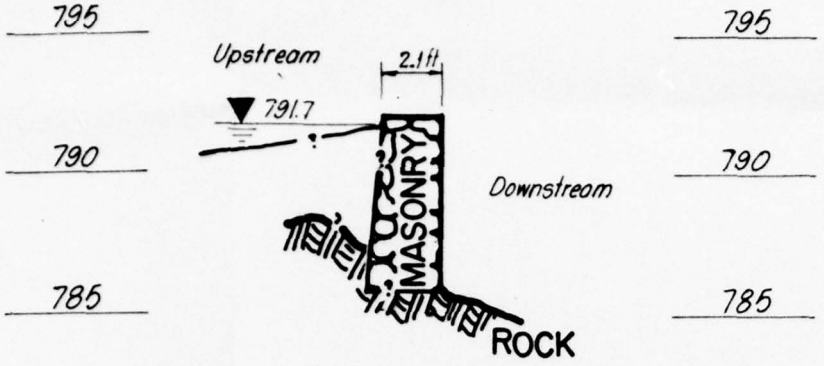
6. The spillway capacity as determined by CE screening criteria is seriously inadequate. We estimate the spillway can adequately pass only 2% of the PMF. The actual capacity of the spillway should be determined using more precise and sophisticated methods and procedures. The need for and type of mitigating measures should be determined. Around the clock surveillance during periods of unusually heavy precipitation should be provided, and a warning system established. This should be done soon.



REGIONAL VICINITY MAP
STICKLE POND DAM

Fig. 1

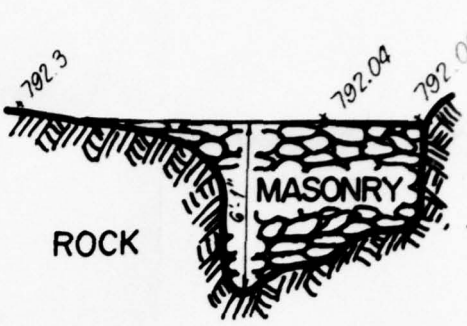
ELEV. IN FEET
U.S.G.S. DATUM



SECONDARY SPILLWAY
CROSS SECTION

SECTION D-D'

0 5 10 15 feet

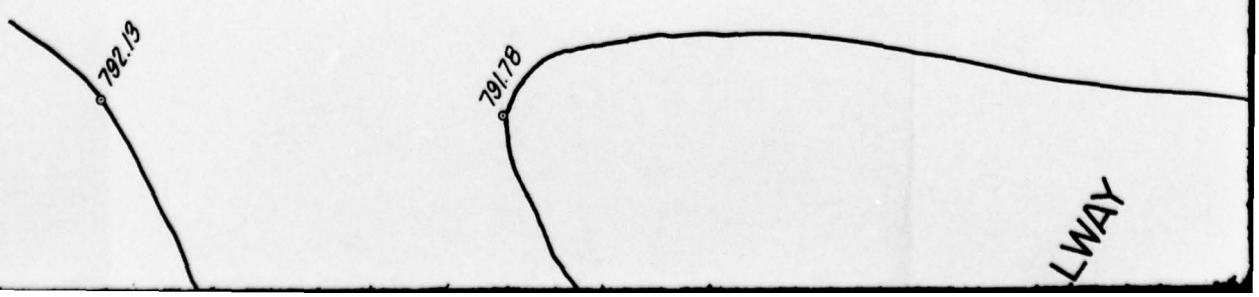


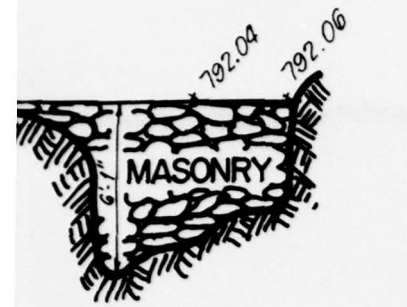
SECONDARY SPILLWAY
DOWNSTREAM ELEVATI

SECTION B-B'

0 5 10 16

S



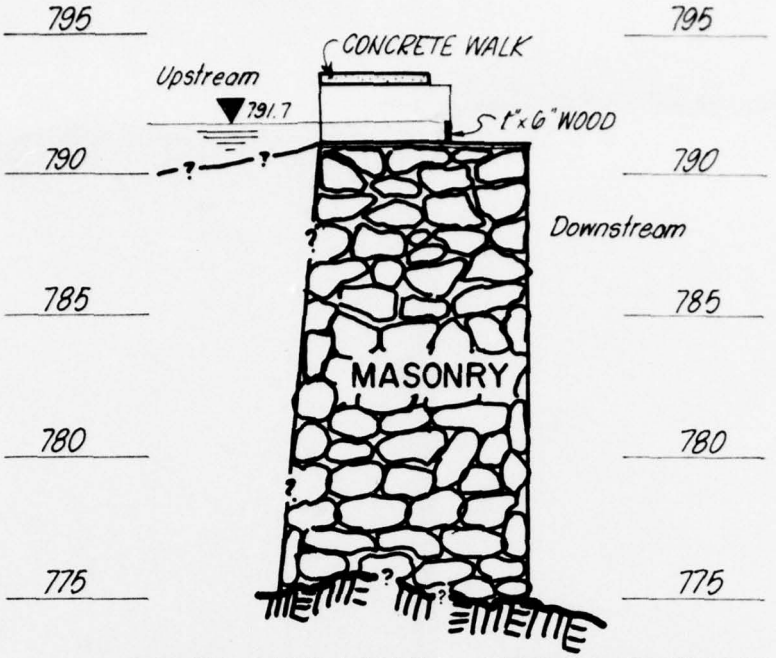


NDARY SPILLWAY
REAM ELEVATION

TION B-B'

5 10 15 feet

ELEV. IN FEET
U.S.G.S. DATUM



MAIN SPILLWAY - CROSS SECTION

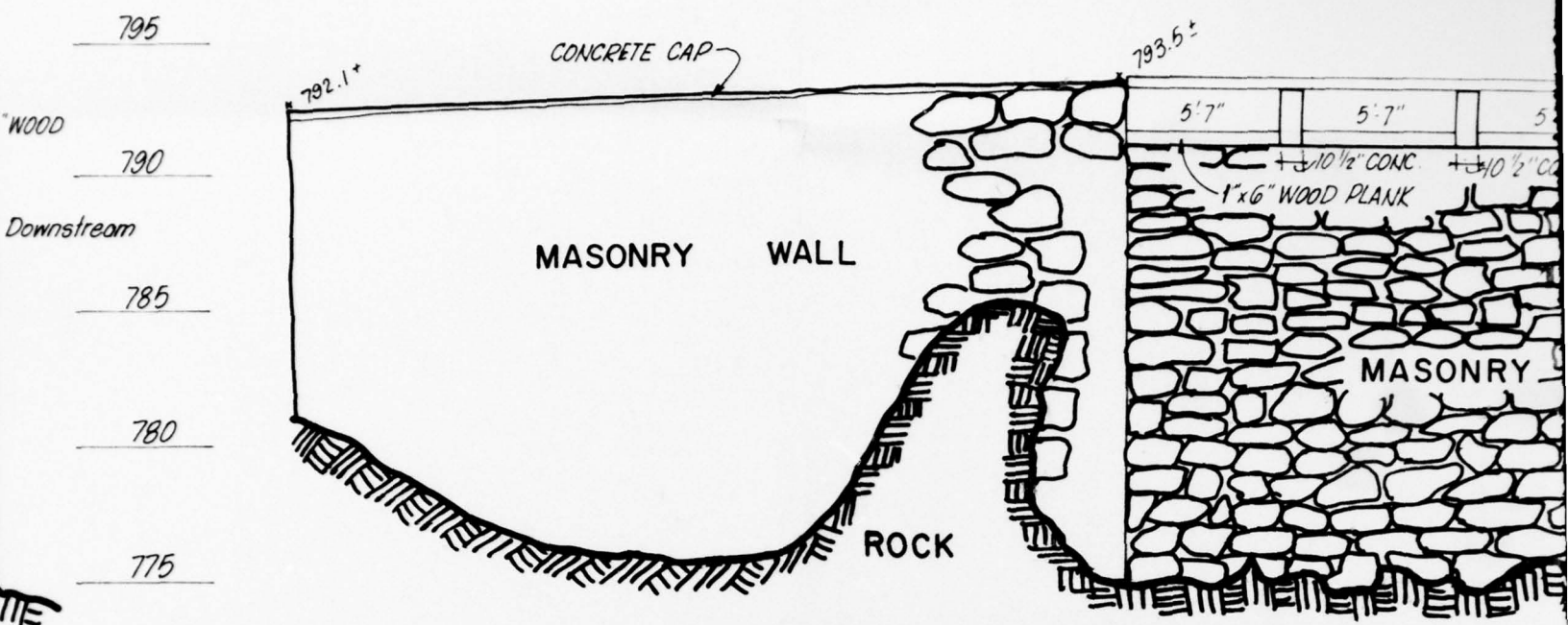
SECTION C-C'

0 5 10 15 feet

S T I C K L E

WATER LEVEL ELEV. 791.7
12 June 1978

WAY



OSS SECTION
C-C'

15 feet

MAIN SPILLWAY - DOWNSTREAM ELEVATIO

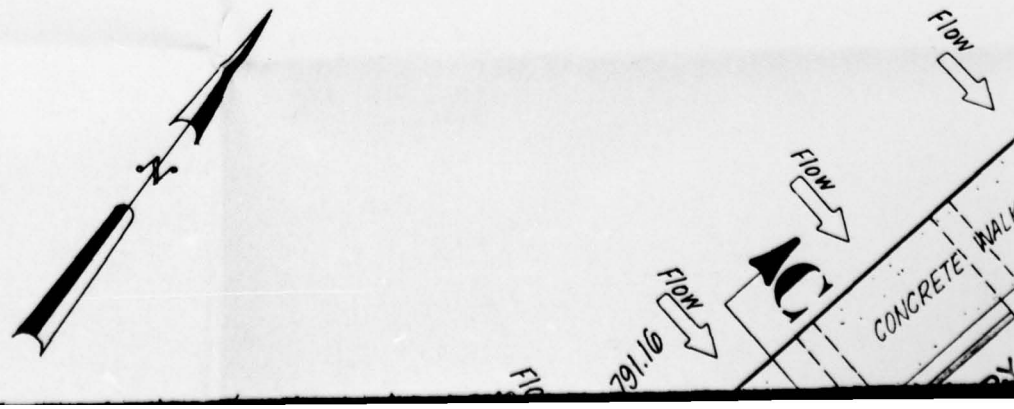
SECTION A-A'

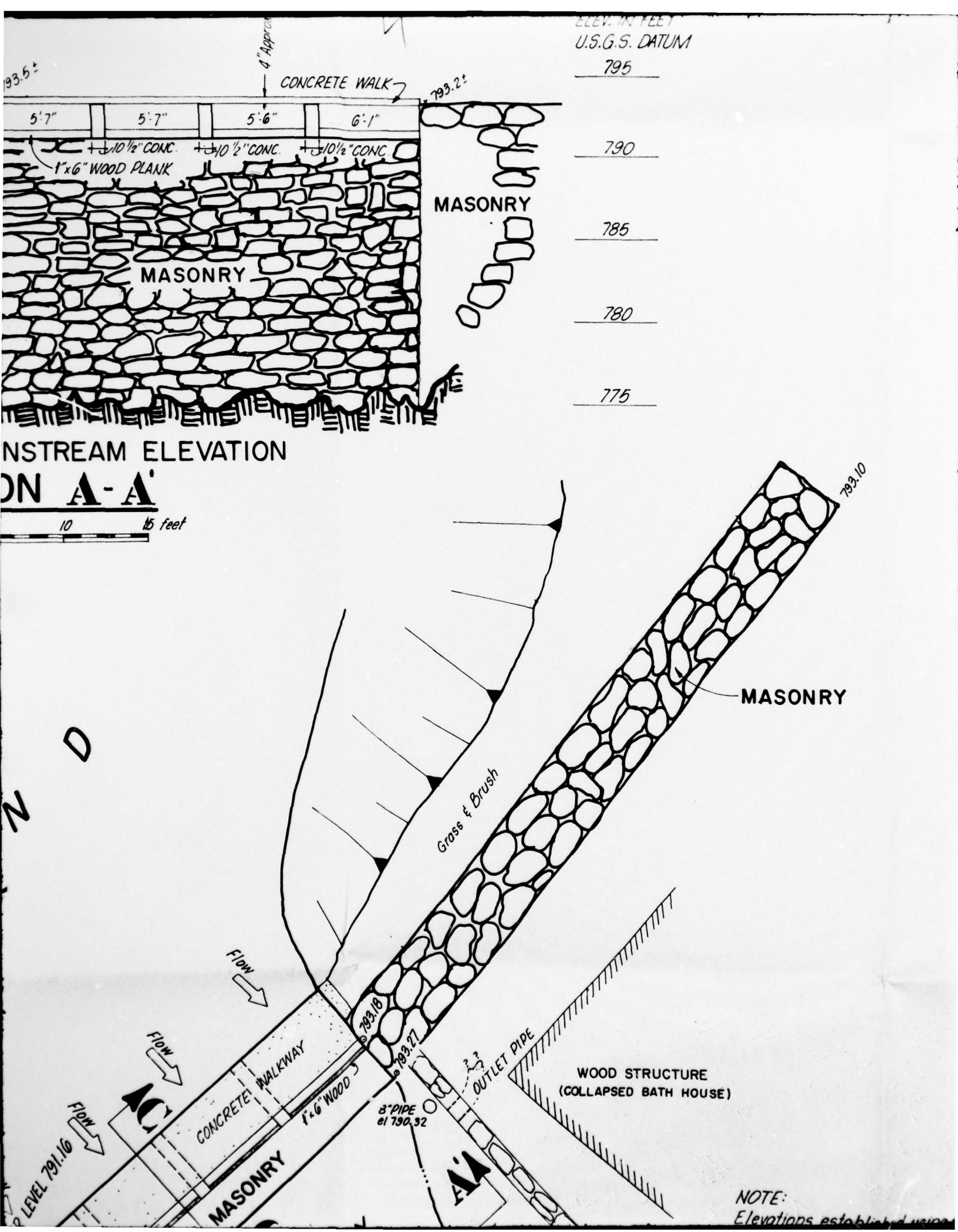
0 5 10 15 feet

P O N D

L E

WATER LEVEL ELEV. 791.7
12 June 1978




ELEV. IN FEET
U.S.G.S. DATUM
795
790
785
780
775
4" Approx.
CONCRETE WALK
793.2±
5'-7"
5'-7"
5'-6"
6'-1"
10½" CONC.
10½" CONC.
10½" CONC.
1"x6" WOOD PLANK
MASONRY
MASONRY
NSTREAM ELEVATION
ON A-A'
10
15 feet
793.10
MASONRY
Grass & Brush
FLOW
FLOW
FLOW
793.18
793.27
CONCRETE WALKWAY
1"x6" WOOD
8" PIPE
el 790.92
OUTLET PIPE
WOOD STRUCTURE
(COLLAPSED BATH HOUSE)
MASONRY
LEVEL 791.16
A
A'
NOTE:
Elevations established using

ELEV. IN FEET
U.S.G.S. DATUM

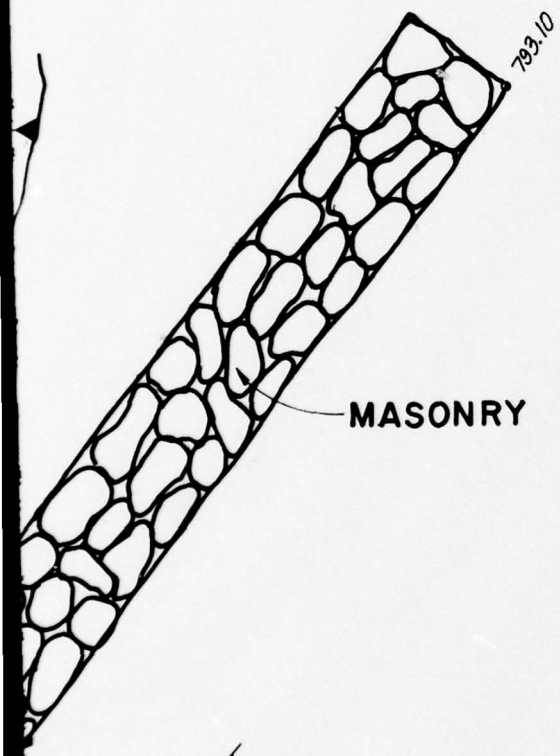
795

790

785

780

775

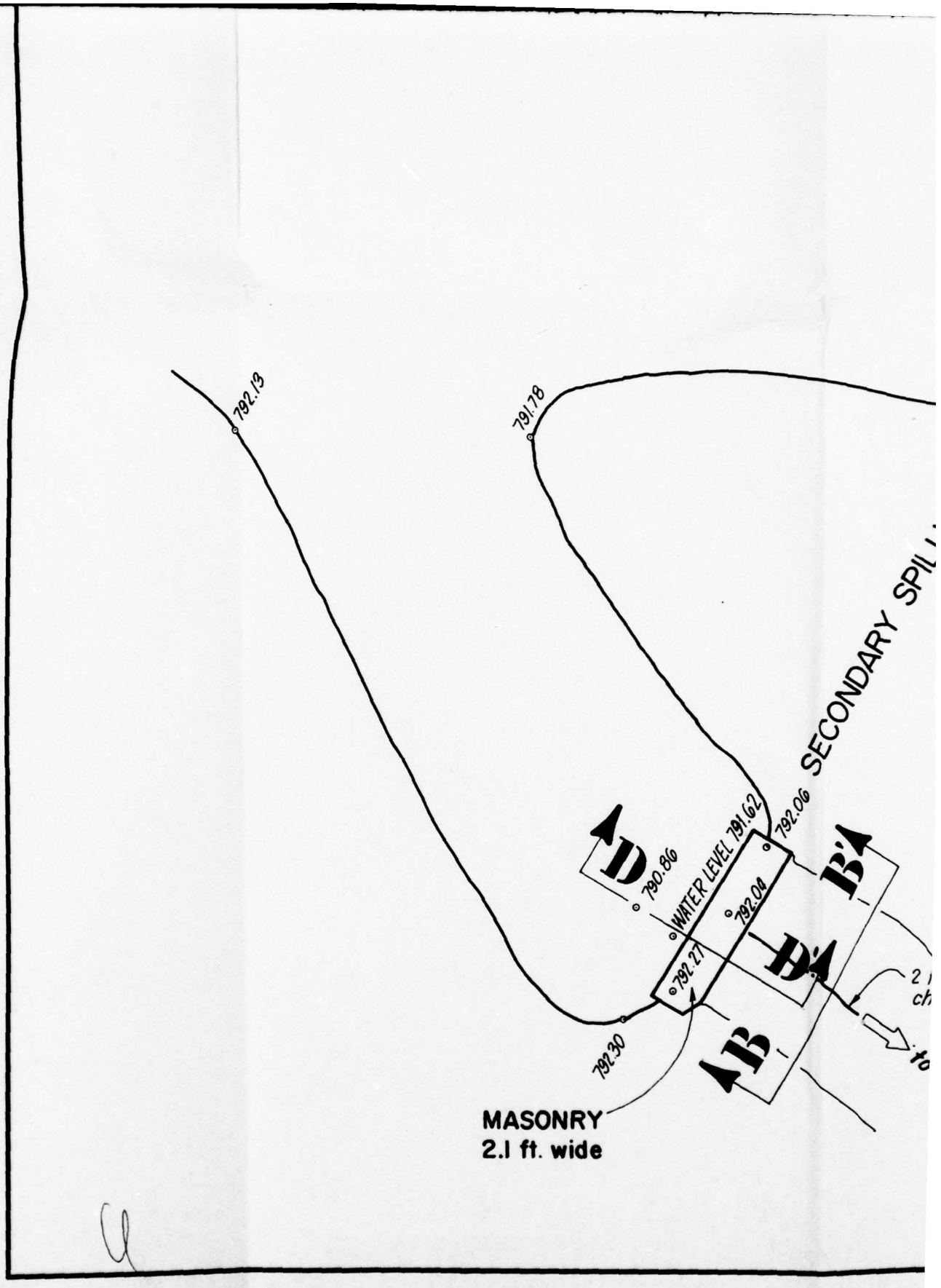


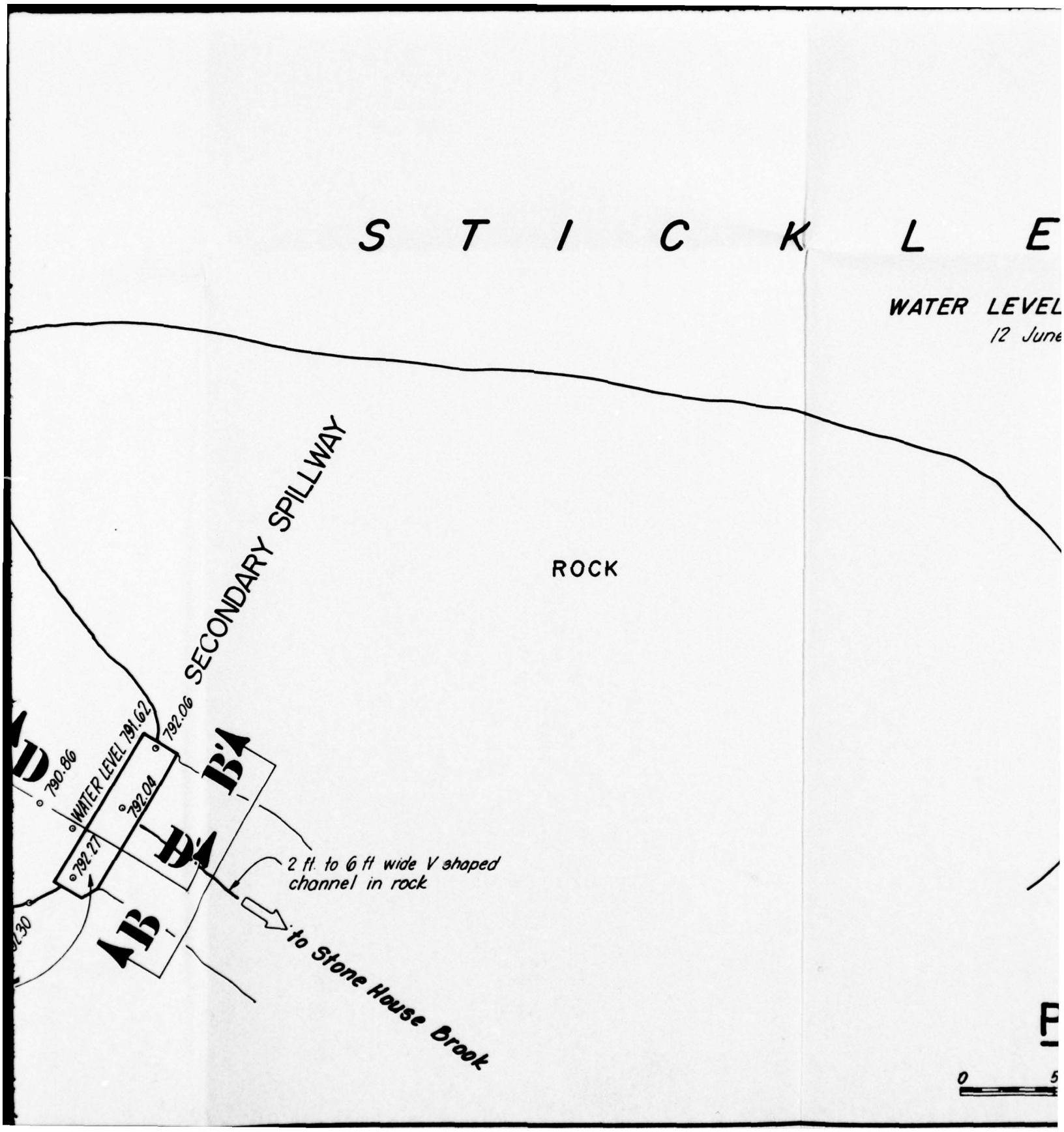
WOOD STRUCTURE
(COLLAPSED BATH HOUSE)

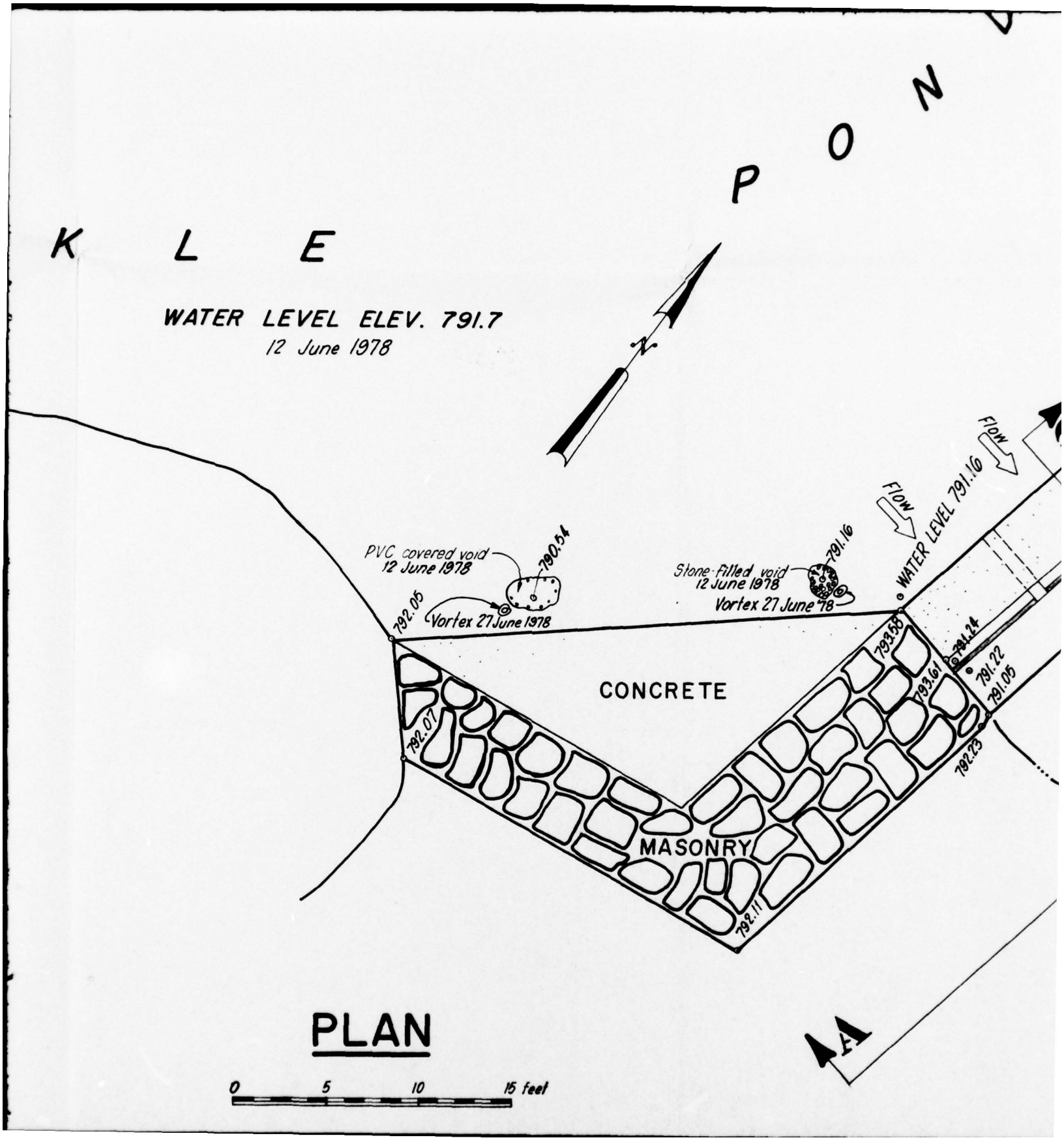
NOTE:
Elevations established using

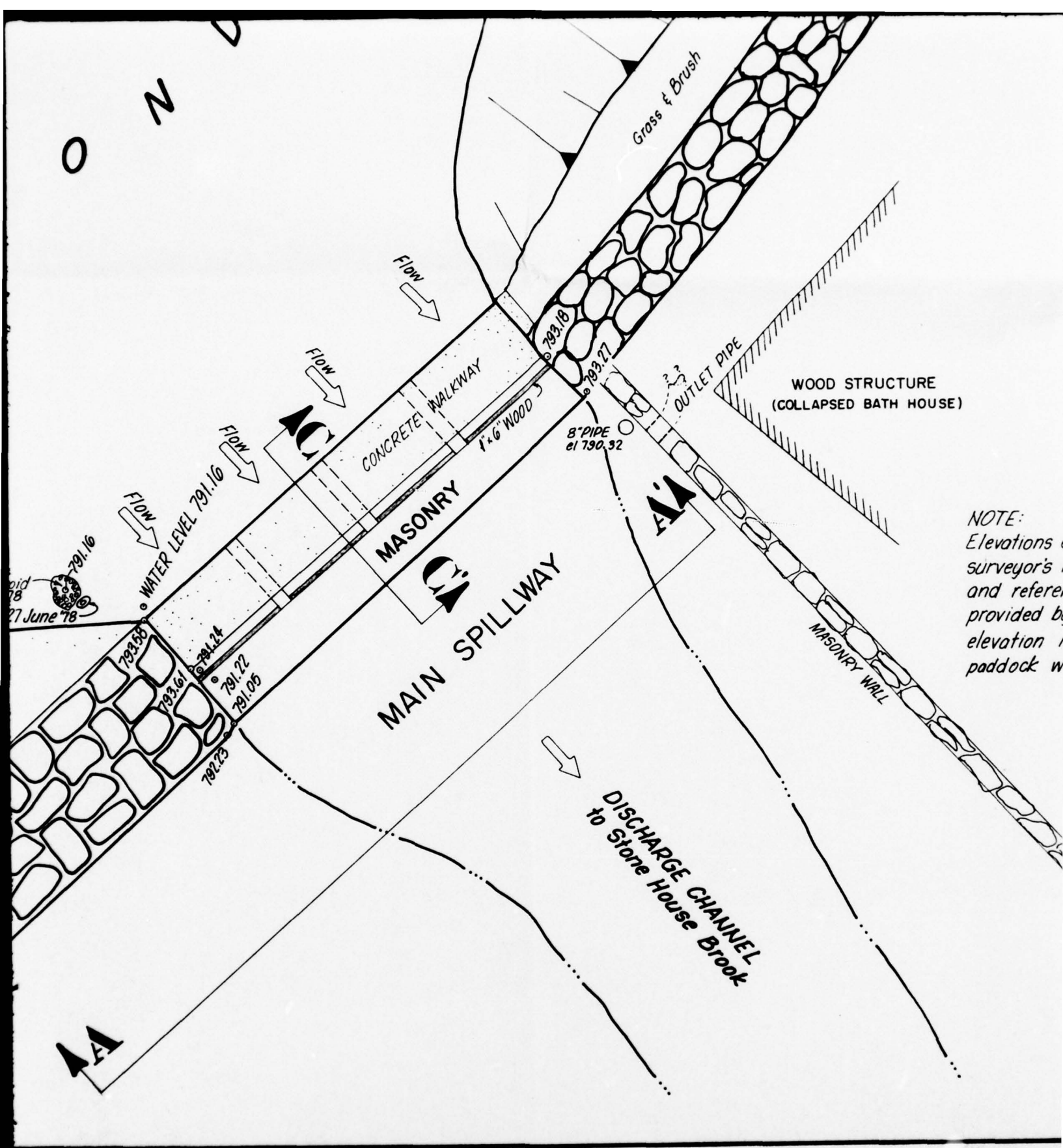
5

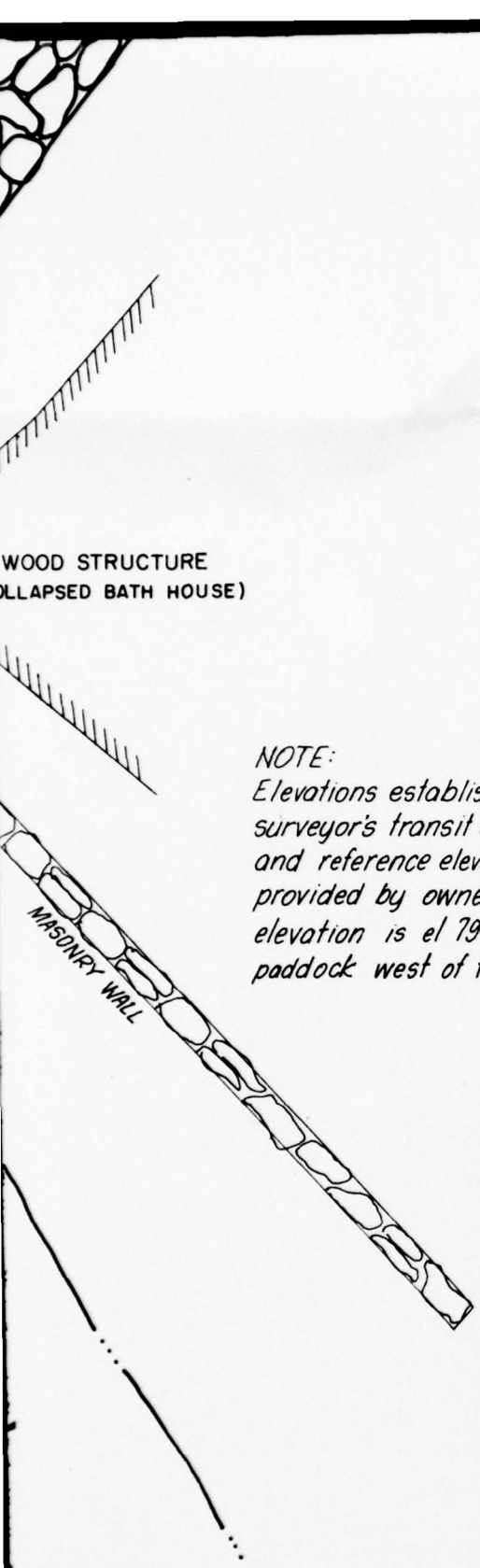
DATE	DESCRIPTION	NO.
REVISIONS		


792.13
791.78
SECONDARY SPIL
D
790.86
WATER LEVEL 791.62
792.06
792.04
792.27
B'A
D'A
AB
792.30
MASONRY
2.1 ft. wide


S T I C K L E
WATER LEVEL
12 June
SECONDARY SPILLWAY
ROCK
792.06
WATER LEVEL 791.62
790.86
792.04
792.27
B'A
B'
AB
2 ft. to 6 ft wide V shaped channel in rock
to Stone House Brook
0
5


K L E
P O N D
WATER LEVEL ELEV. 791.7
12 June 1978
N
FLOW
FLOW
WATER LEVEL 791.16
PVC covered void
12 June 1978
790.54
792.05
Vortex 27 June 1978
Stone-filled void
12 June 1978
791.16
Vortex 27 June '78
793.58
793.61
791.24
791.22
791.05
792.73
CONCRETE
792.07
MASONRY
792.11
A
A
PLAN
0 5 10 15 feet


Grass & Brush
Flow
Flow
Flow
Flow
793.18
793.27
CONCRETE WALKWAY
1×6" WOOD
8" PIPE
el 790.32
OUTLET PIPE
WOOD STRUCTURE
(COLLAPSED BATH HOUSE)
MASONRY
WATER LEVEL 791.16
791.16
793.56
794.24
793.61
791.22
791.05
791.23
MAIN SPILLWAY
MASONRY WALL
DISCHARGE CHANNEL
to Stone House Brook
A
A'
NOTE:
Elevations
surveyor's
and refere
provided b
elevation
paddock w



NOTE:
Elevations established using surveyor's transit and level; and reference elevations provided by owner. The reference elevation is el 793 at a horse paddock west of the dam.

DATE	DESCRIPTION	NO.
REVISIONS		

PROJECT

PHASE I
INSPECTION & EVALUATION of NEW JERSEY DAMS

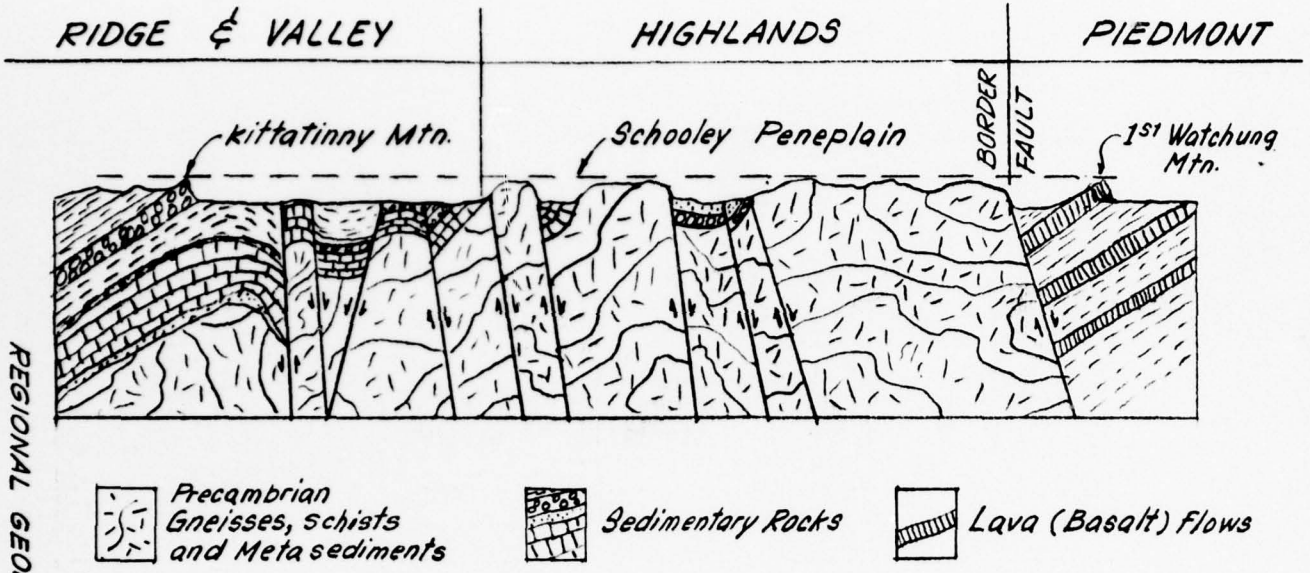
STICKLE POND DAM
JUNE 1978

FED. ID. No. NJ 00285

JOB NO.	J 783
DATE	5 July 1978
SCALE	as noted
DRN. BY	JMR
CHKD. BY	DJL

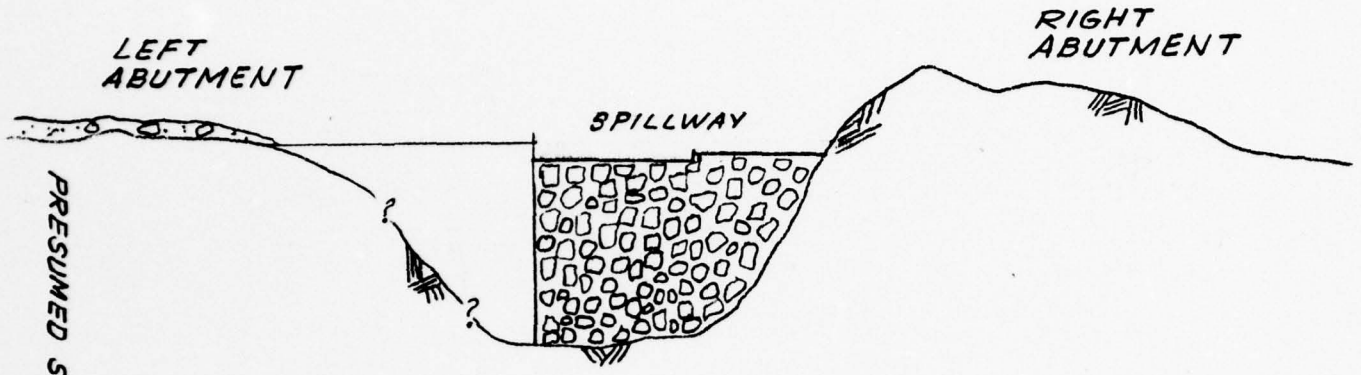
FIG. 2

REGIONAL GEOLOGIC FEATURES



Schematic Cross-section of New Jersey Highlands Physiographic Province (After Wolfe, 1977)

Fig 3



DIAGRAMMATIC SKETCH
STICKLES POND DAM
(NO SCALE)

PRESUMED SITE GEOLOGIC FEATURES

Fig 4

APPENDIX 1

CHECK LIST

VISUAL INSPECTION

STICKLE POND DAM

STICKLE POND DAM
Check List
Visual Inspection
Phase 1

Name Dam Stickle Pond Dam County Morris State New Jersey Coordinators NJ DEP

Date(s) Inspection 5,7 and 12 June 1978 Weather Sunny Temperature 70 - 80°F

Pool Elevation at Time of Inspection El 792 M.S.L. Tailwater at Time of Inspection El 774 M.S.L.

Inspection Personnel:

A. Puyo	D. Lachel	
D. Leary		
C. Campbell		

D. Leary Recorder

STICKLE POND DAM

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE	Clean water observed seeping from downstream face of dam at right spillway abutment, approximately 10 gpm.	Some erosion of mortar may occur over a long time period.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Right Masonry dam abuts at natural rock outcrop. Minor seepage observed at right abutment rock-masonry contact.	Conditions Satisfactory
DRAINS	None Observed	
WATER PASSAGES		
FOUNDATION	Rock	

STICKLE POND DAM

~~CONCRETE~~/MASONRY DAMS

VISUAL EXAMINATION OF	OBERSVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	NONE OBSERVED	
STRUCTURAL CRACKING	NONE OBSERVED	
VERTICAL AND HORIZONTAL ALIGNMENT	GOOD	
MONOLITH JOINTS	NONE OBSERVED	
CONSTRUCTION JOINTS	NONE OBSERVED	

STICKLE POND DAM

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OUTLET CONDUITS STEEL PIPES	Purpose and present function of pipes are presently unknown. It appears two pipes are passing through the dam near the top, 12" and 6" dia. The 6" dia. pipe is flowing at 70 gpm with outlet 3 ft. below reservoir level. The 12" dia. appears to be closed by one of two valves located downstream of the dam at left abutment of	The present locations, sizes and conditions of the pipes passing through the dam and the valves should be determined. However, it is important to note the pipes are not necessary for the proper functioning of the
INTAKE STRUCTURE NONE	spillway section. Another 6" dia. pipe enters former bath house and is flowing at 1/4 gpm. Two other pipes have been reported to us by the owner. One was used to provide water to the house. This pipe is no longer in use. The other pipe is reported to provide water to a fire hydrant on	spillways.
OUTLET STRUCTURE SEE SPILLWAYS	the Smoke Rise property.	
OUTLET CHANNEL NONE		

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	There are two spillway sections: The main spillway section is at the dam and has 6 in. stoplogs. A secondary spillway section is located south of the dam. Both spillways are masonry and free fall.	Stoplogs should not be left in place or raised because of increase in piping potential. The secondary is bowed downstream and silted upstream.
APPROACH CHANNEL	NONE OBSERVED	
DISCHARGE CHANNEL	Stone House Brook has rock bottom at downstream toe of spillway and is relatively clean of debris and obstructions.	
BRIDGE AND PIERS	A foot bridge passes over the spillway and is supported by short piers on the crest of the spillway.	

STICKLE POND DAM

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Appear Stable	No evidence of slope instability.
SEDIMENTATION	Not considered significant. Sedimentation is estimated at being very small because of the large amount of tree cover in catchment area.	

STICKLE POND DAM

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Downstream channel is relatively free of obstructions and debris.	
SLOPES	Slopes are 10 hor to 1 vert and 30 hor to 1 vert.	
APPROXIMATE NO. OF HOMES AND POPULATION	Kinnelon is reported to be the nearest downstream city with a population of 7,600.	

APPENDIX 2

PHOTOGRAPHS

STICKLE POND DAM

Spillway looking downstream. 12 June 1978
Note: Gravel covering former vortex location in foreground.

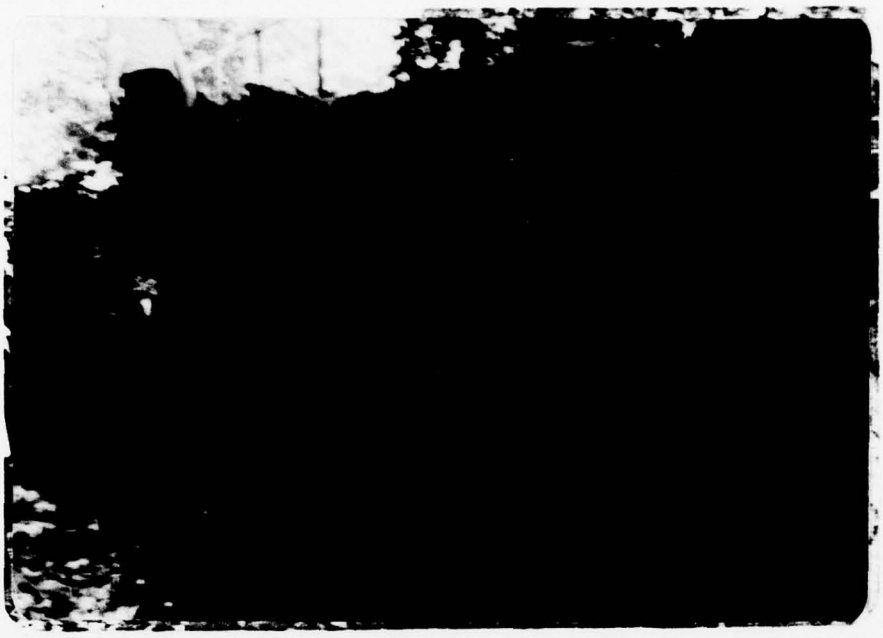
Spillway looking North. 12 June 1978
Note: Six inch high stoplogs in place and water discharging from 8 inch dia. pipe.

Spillway Looking Upstream 12 June 1978

Bottom of Spillway 12 June 1978

Downstream Corner of Masonry Dam 12 June 1978

Left masonry-Earth embankment looking South 12 June 1978



Downstream face of masonry-Earth embankment — 12 June 1978

Rock at Masonry wall:Looking upstream — 12 June 1978

Entrance inlet to Secondary Spillway 12 June 1978

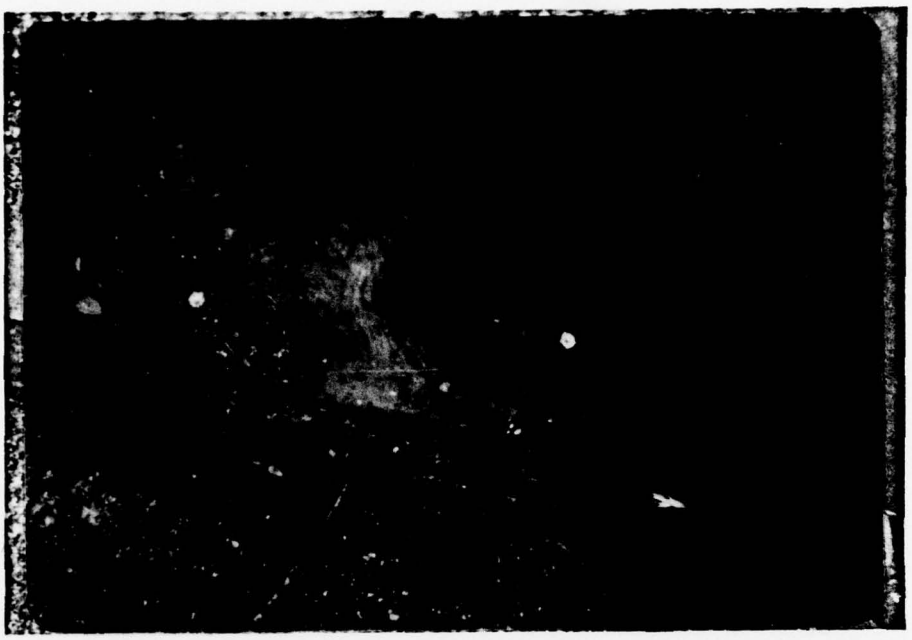
Secondary Spillway looking upstream 12 June 1978

Secondary Spillway looking upstream 12 June 1978

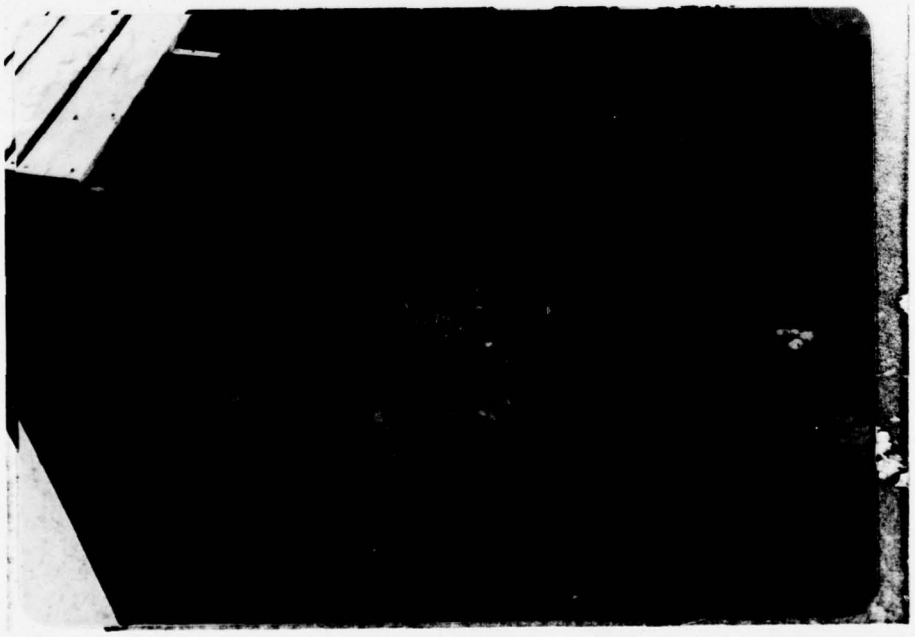
Secondary Spillway Discharge Channel 12 June 1978

Former Vortex location covered with PVC and held down with stones — 12 June 1978

Former Vortex location covered with 1 1/2" stone — 12 June 1978



Small Vortex occuring adjacent to PVC and observable at lowered pond level. 12 June 1978



Small Vortex occuring and adjacent to 1 1/2" stone cover.
Note debris collected above stone. 12 June 1978

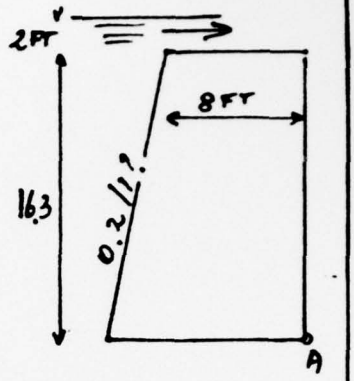
STICKLE POND DAM

APPENDIX 3

ENGINEERING COMPUTATIONS

STICKLE POND DAM

LANGAN ENGINEERING ASSOCIATES, INC.



UPSTREAM SLOPE OF WALL
ASSUMED TO BE 0.2/1

2FT OF WATER ABOVE SPILLWAY CREST

COEFFICIENT OF FRICTION FOR SLIDING = 0.8

ASSUMPTION (A) NO UPSTREAM BACKFILL

wall weight	$8 \times 144 \times 16.3$	= 18778	lb/ft	$M^r/_A = 18778 \times 4$	= 75112 ft-lb/ft
	$\frac{1}{2} \times 0.2 \times \overline{16.3}^2 \times 144$	= 3826		$= 3826 \times 9.0867$	= 34766
water weight	$2 \times 62.5 \times (0.2 \times 16.3 + 8)$	= 1407		$= (8 + 0.2 \times 16.3)\frac{1407}{2}$	= 7921
	$\overline{16.3}^2 \times \frac{0.2}{2} \times 62.5$	= 1660		$= 1660(8 + \frac{0.2}{3} \times 16.3)$	= 16888
Uplift	$18.3 \times \frac{11.26}{2} \times 62.5$	= 6439		$= -6439 \times \frac{2}{3} 11.26$	= -48335
water pressure	$\overline{18.3}^2 \times 62.5 \times 0.5$	= 10340		$= 10465 \times \frac{18.3}{3} - 125 \times 17$	= -61713
	$-2^2 \times 62.5 \times 0.5$				

Safety factors

$$S_F = \frac{19232 \times 0.8}{10340} = 1.50 \text{ (sliding)} \qquad S_F = \frac{134687}{110048} = 1.22 \text{ (overt.)}$$

ASSUMPTION (B) UPSTREAM BACKFILL - NO UPLIFT

wall weight	$8 \times 144 \times 16.3$	= 18778 lb/ft	$M^r/_A =$	= 75112
	$0.5 \times 0.2 \times 16.3^2 \times 144$	= 3826		= 34776
water weight	$2 \times 62.5 \times 11.26$	= 1407		= 7921
	$0.1 \times \overline{16.3}^2 \times 62.5$	= 1660		= 16888
soil weight	$0.1 \times \overline{16.3}^2 \times 62.5$	= 1660		= 16888
water pressure		10340	$M^r/_A =$	= -61713
Soil pressure	$\frac{16.3^2}{2} \times 62.5 \times 0.5$	= 4151	$= 4151 \times \frac{16.3}{3}$	= -22556

Safety factors

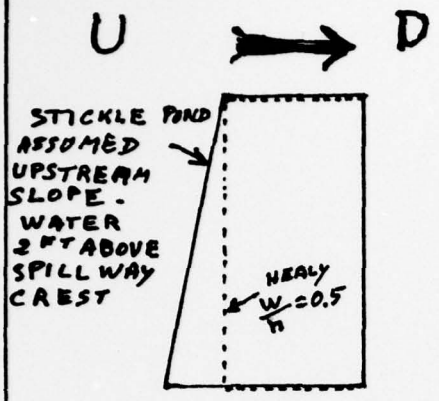
$$S_F = \frac{27331 \times 0.8}{14491} = 1.50 \text{ (sliding)} \qquad S_F = \frac{151585}{84269} = 1.80 \text{ (overturning)}$$

BY JMAP DATE 6.26.78 STICKLE POND DAM JOB NO.

CKD JC DATE 8.5.76 SPILLWAY STABILITY SHEET NO. 1 OF

LANGAN ENGINEERING ASSOCIATES, INC.

COMPARISON WITH HEALY'S FACTOR OF SAFETY



	SAFETY FACTORS SLIDING	OVERTURN.
STICKLE POND ASSUM. (A)	1.50	1.22
HEALY $\frac{W}{h}$ = .5 CASE 3	1.50	1.80
STICKLE POND ASSUM (B)	1.50	1.80
HEALY $\frac{W}{h}$ = .5 CASE 4	1.3	1.40

BACKFILL EXISTS AGAINST UPSTREAM FACE OF SPILL WAY

TO CHECK THE VALIDITY OF ASSUMPTION (B) THE SLOPE OF UPSTREAM FACE SHOULD BE CHECKED TOGETHER WITH THE UPSTREAM PIEZOMETRIC LEVEL WITHIN THE BACKFILL

BY JMAP DATE 6-26-78 STICKLE POND DAM JOB NO.

CKD. DATE SPILLWAY STABILITY SHEET NO. 2 OF

APPENDIX 4

HYDROLOGIC COMPUTATIONS

STICKLE POND DAM

LANGAN ENGINEERING ASSOCIATES, INC.

STICKLE POND DAM
HYDROLOGIC CALCULATIONS

A. Location - Morris County New Jersey with Passaic River Basin

B. Pertinent data

1. Pond Surface Area - Approx 124 acres
2. Drainage Basin - 1683 acres or 2.63 sq mi
3. Storage Capacity - 1000 ac ft

$125 \times 8 = 1000$ ac ft

4. Size Classification - Intermediate based on storage
5. Hazard Potential - High (by Corp of Engineers)

C. Spillway Design Flood (SDF)

In accordance with evaluation guidelines the recommended SDF for the above size and hazard classification is the probable maximum flood (PMP). The hydrograph for the PMF is determined using

D. PMP

1. Zone 6 PMP = 22.5 inches (200 sq mi 24 hr)
2. PMP must be adjusted for basin size & reduction factor

Duration	% 24 hr for 10 sq mi	Reduction factor *
0-6	112	.8 for all hrs
0-12	123	
0-24	132	
0-48	142	

* p 48 "Small Dams"

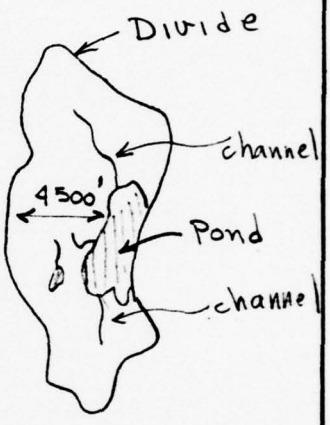
BY JC DATE ____ Stickle Pond JOB NO. J-783

CKD GED DATE 8.8.78 SHEET NO. 1 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

DETERMINE TIME OF CONCENTRATION

Since there is no one defined main channel for the Stickle Pond water shed, we will take overland flow to determine Tc



The average slope of the water basin is = 3 %

Average Length = 4500 ft

From SCS Tech Rel #55

From a site inspection

The ground cover is

"Forest with Heavy Ground Litter & Meadow

A From Fig 3-1

velocity = .43 ft/sec

$$T_c = \frac{\text{length}}{\text{velocity}} = \frac{4500 \text{ ft}}{0.43 \frac{\text{ft}}{\text{sec}} \left(3600 \frac{\text{sec}}{\text{hr}}\right)}$$

T_c = 2.91 hours

B Determine Tc by Fig 3.3 Tech Rel #55

Take l = Greatest flow length

= 5500 feet

BY JC DATE 8/5 Stickle JOB NO. J-783

CKD GED DATE 8.8.78 SHEET NO. 2 OF 10

Lag Time = 1.3 hr

$T_c = \frac{1.3}{0.6} = 2.2$ hours

CHOOSE $T_c = 3.0$ hrs

DETERMINE TIME TO PEAK

$T_p = \frac{D}{2} + 0.6 T_c$

Take D between $.2 T_c - .3 T_c$

$\therefore D = 0.67$ hr

$T_p = \frac{0.67}{2} + 0.6(3) = 2.13$ hours

$\therefore \boxed{T_p = 2.13 \text{ HOURS}}$

UNIT HYDROGRAPH

Take q_p from SCS formula

$q_p = \frac{484 A}{T_p} = \frac{484 (2.63)}{2.13} = 597$ cfs

LANGAN ENGINEERING ASSOCIATES, INC.

A curvilinear hydrograph may be constructed from the values of q_p and T_p by using ratios tabulated in "Design of Small Dams" pg 74

Take the time increment = D

HOURS	T/T_p	q/q_p	UNIT HYDROGRAPH q_p
.67	.31	0.21	125
1.33	.62	0.670	401
2.0	.94	0.992	593
2.67	1.25	0.900	538
3.33	1.56	0.600	359
4.00	1.87	0.340	203
4.67	2.19	0.240	144
5.33	2.50	0.155	93
6.00	2.82	0.097	58
6.67	3.13	0.068	41
7.33	3.44	0.041	25
8.0	3.76	0.027	16
8.67	4.07	0.013	8
9.33	4.38	0.009	5

$\Sigma q = 2609$

Area Under Unit Graph $= \frac{2609\,(.67)\,(3600)\,(12)}{1683 \quad (43560} = 1.03''$

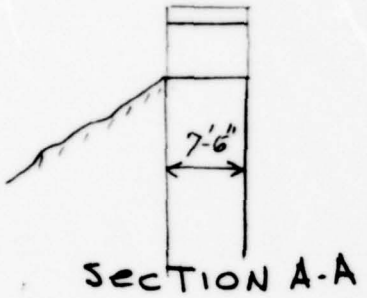
BY JC DATE 8/5 stickle JOB NO. J-783

CKD GED DATE 8.8.78 SHEET NO. 4 OF 10

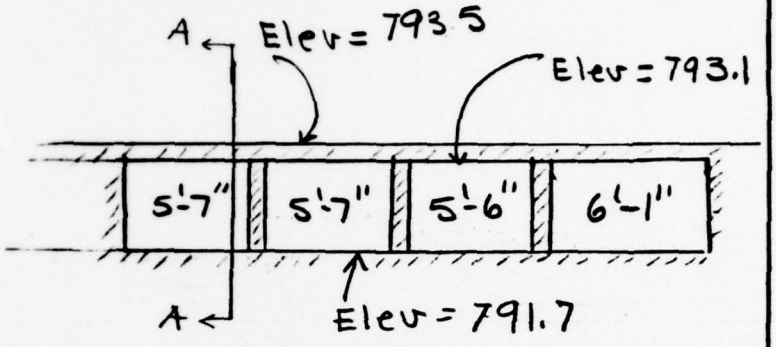
LANGAN ENGINEERING ASSOCIATES, INC.

SPILLWAY CAPACITY

$Q = C L H^{3/2}$



SECTION A-A



Shape of weir is similar to those shown in "Handbook of Hydraulics" Fig. 5-10 & 5 & 12. Tables for C values presented on page 5-50.

Primary Spillway

Choose $C = 3.39$
$L = 22.75$ feet

Secondary spillway $L = 12$ feet
Same Cross section ∴ $C = 3.39$

Crest of the primary spillway
at Elev = 791.7 feet, $C = 3.39$

Crest of the secondary spillway
at Elev = 792.05 feet $C = 3.39$

Top of the reservoir
at Elev = 792.1 feet
Cross section Similar to section A-A ∴ $C = 3.39$

BY JC DATE 8/5 Stable JOB NO. J-783
CKD GED DATE 8-8-78 SHEET NO. 5 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

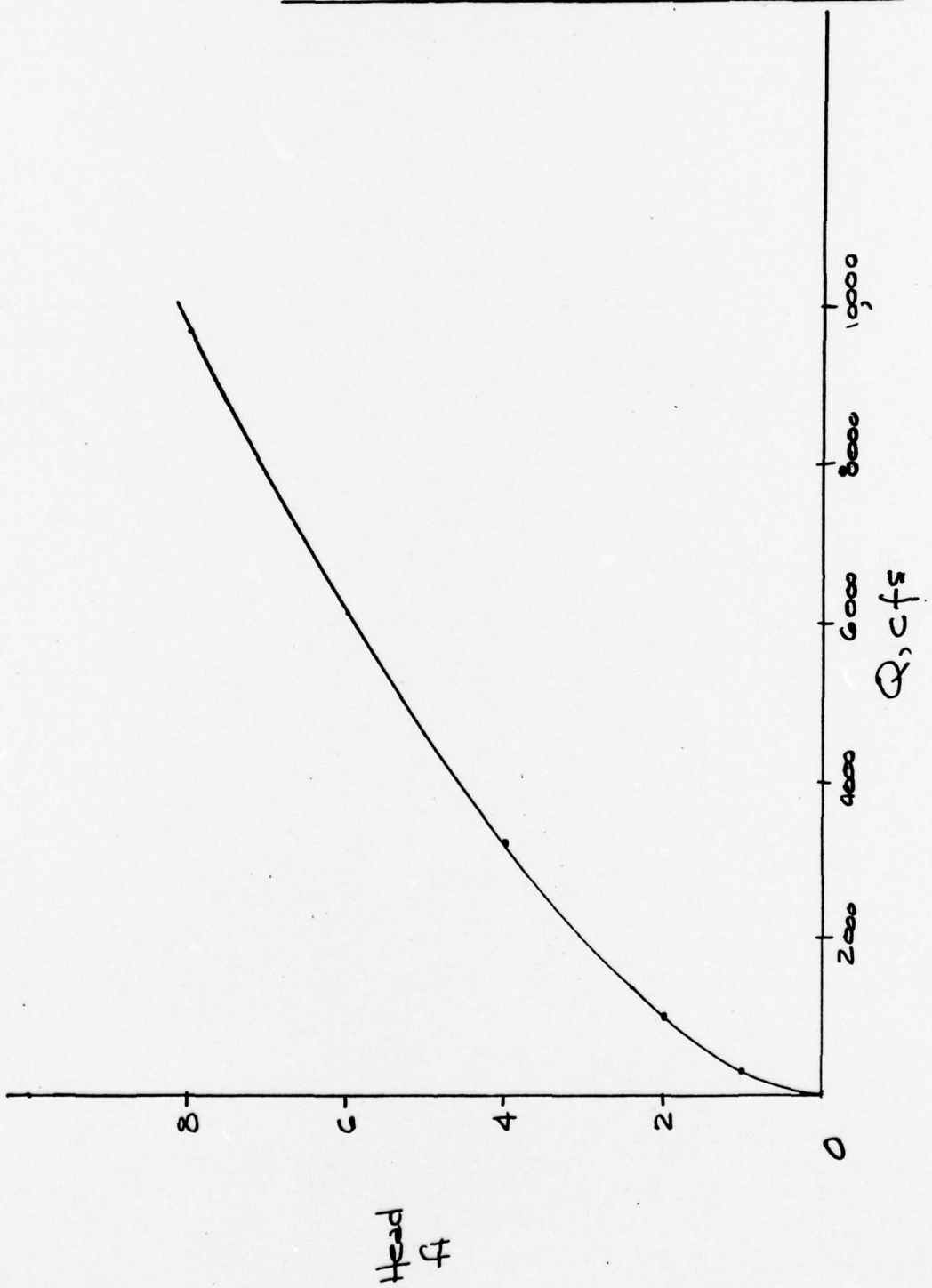
Elev	PRIMARY SPILLWAY H (ft)	PRIMARY SPILLWAY Q (cfs)	Secondary Spillway H (ft)	Secondary Spillway Q (cfs)	Reservoir H (ft)	Reservoir L (ft)	Reservoir Q (cfs)	Q TOTAL (cfs)
791.7	0	0						0
791.8	.1	2.4						2
791.9	.2	6.9						7
792.0	.3	12.7						13
792.1	.4	19.5	.05	.5	0			20
792.3	.6	35.8	.25	5.	.2	60	16	57
792.7	1.0	77.1	.65	21	.6	75	225	323
793.1	1.4	127.8	1.05	44	1.0	100	300	481
793.7	2.0	218	1.65	87	1.6	100	686	1000
794.1	2.4	286.7	2.05	119	2.0	100	959	1367
795.7	4.0	616.9	3.65	283	3.6	100	2315	3215.5
797.7	6.0	1133	5.65	546	5.6	100	4492	6171.43
799.7	8.0	1745	7.65	860	7.6	100	7102	9707.64

BY JC DATE 8/5 Stickle JOB NO. J-783

CKD CED DATE 8.8.78 Rev 8.15.79 SHEET NO. 6 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

SPILLWAY CAPACITY CURVE



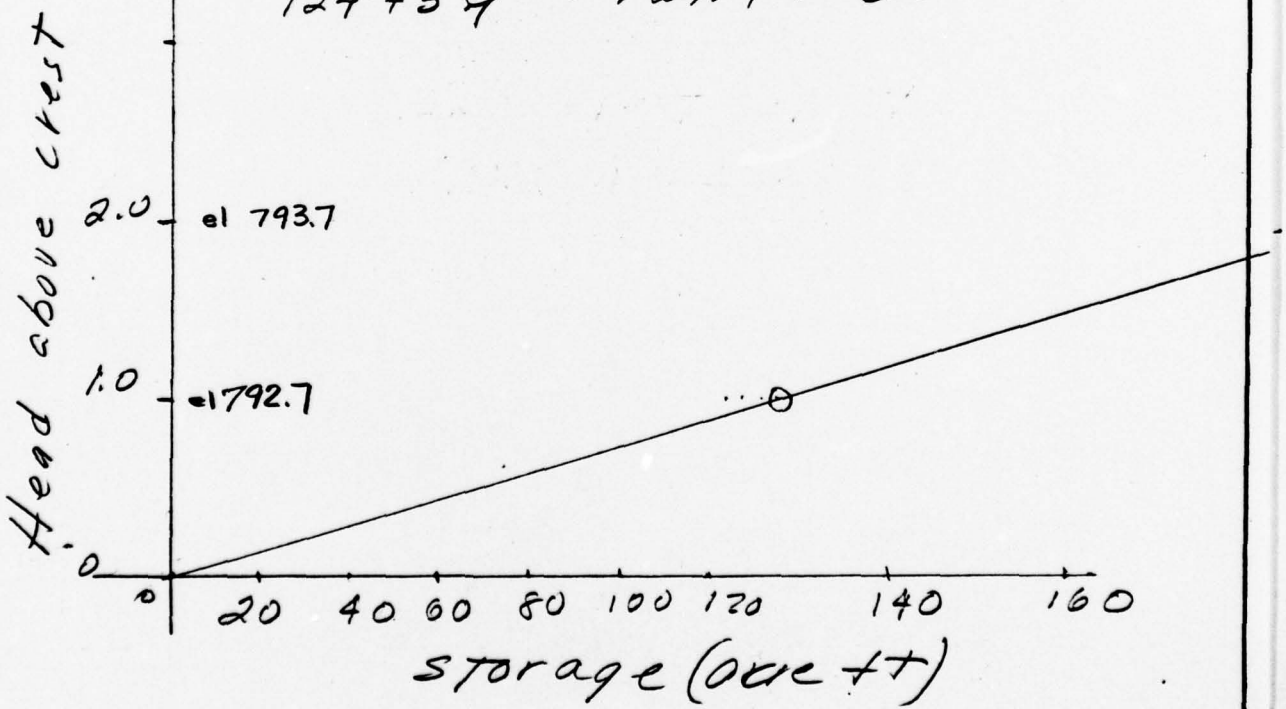
BY JC DATE _____ Stickle JOB NO. J-783

CKD GED DATE 8.8.78 Rev 8.15.78 SHEET NO. 7 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

STORAGE CAPACITY

1. Lake perimeter = 8.5"(2000) ≅ 17,000 ft
2. Assuming a 10% slope at shoreline
3. At Elev of 2 ft above crest we are 20 ft from lake edge. Additional area = 17000×(20) = 340,000 ft²
   area = 7.8 acres
4. ∴ 2 ft above crest area would ≅ 124 + 7.8 = 131.8 acres
   1 ft above crest
   124 + 39 = 127.9 acres



BY JC DATE 7/12 STICKLE JOB NO. J-783
CKD GED DATE 8.8.78 SHEET NO. 8 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

Elev	H (ft)	Q TOTAL (cfs)	Storage (acre-ft)
	0	0	0
	.1	2	12.8
	.2	7	25.6
	.3	13	38.4
	.4	20	51.1
	.6	57	76.7
792.7	1.0	323	127.9
	1.4	481	179.1
793.7	2.0	1000	255.8
	2.4	1367	307.0
795.7	4.0	3215	512
797.7	6.0	6171	768
799.7	8.0	9707	1024

HYDROGRAPH & FLOOD ROUTING

1. Hydrograph determined using HEC-1; output attached
2. PMF = 6838 cfs (routed to 6300 cfs) which is much greater than spillway capacity

3. Flood routing indicates dam will overtop for PMF by 5.6 ft (el 797.7)

(OVERTOPPING BEGINS AT H = 0.4 or el 792.1)

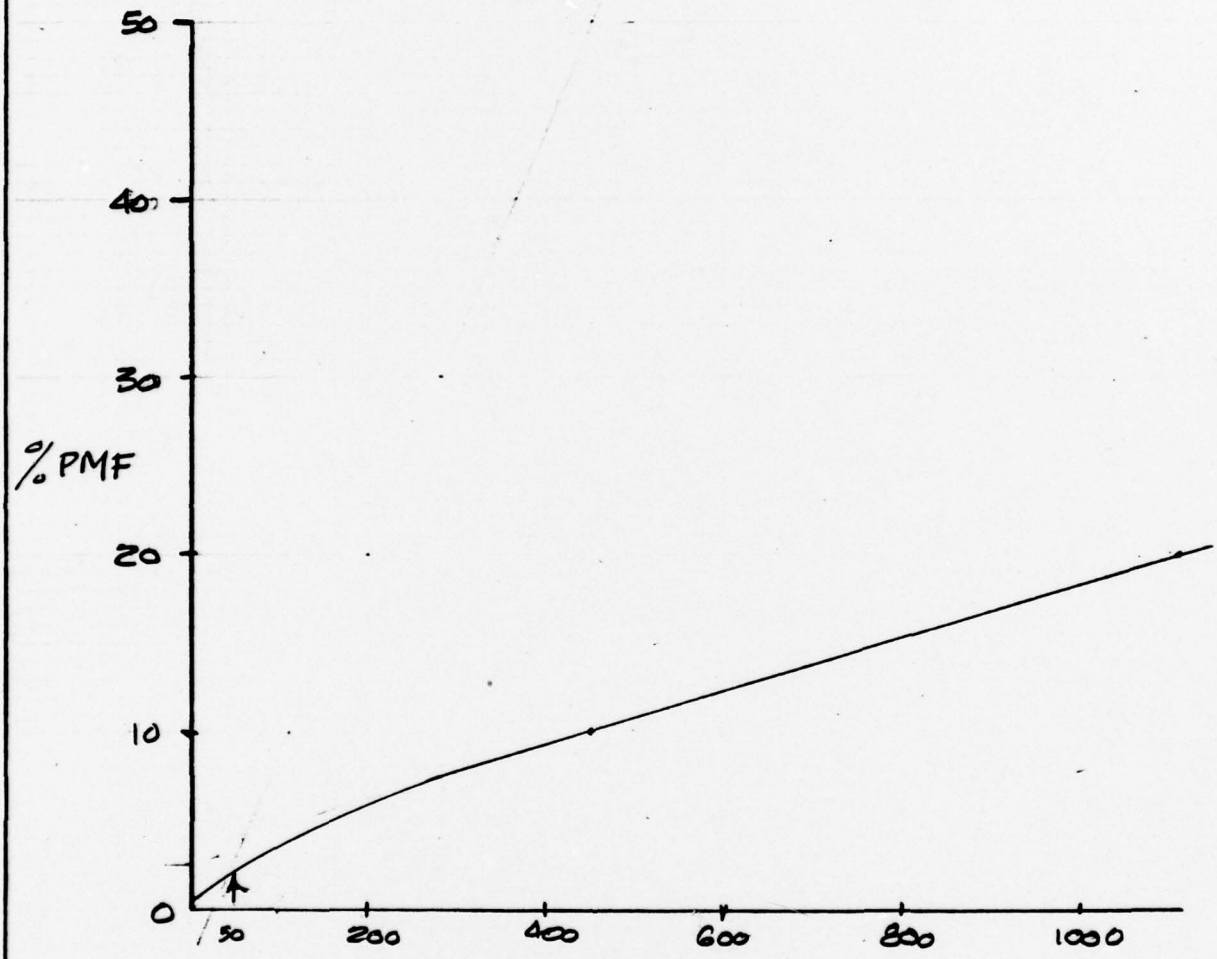
BY JC DATE 8/5 Stickle JOB NO. J-783

CKD GED DATE 8.8.78 SHEET NO. 9 OF 10

LANGAN ENGINEERING ASSOCIATES, INC.

OVERTOPPING POTENTIAL

1. Various % PMF have been routed
2. Plot peak outflow vs % PMF



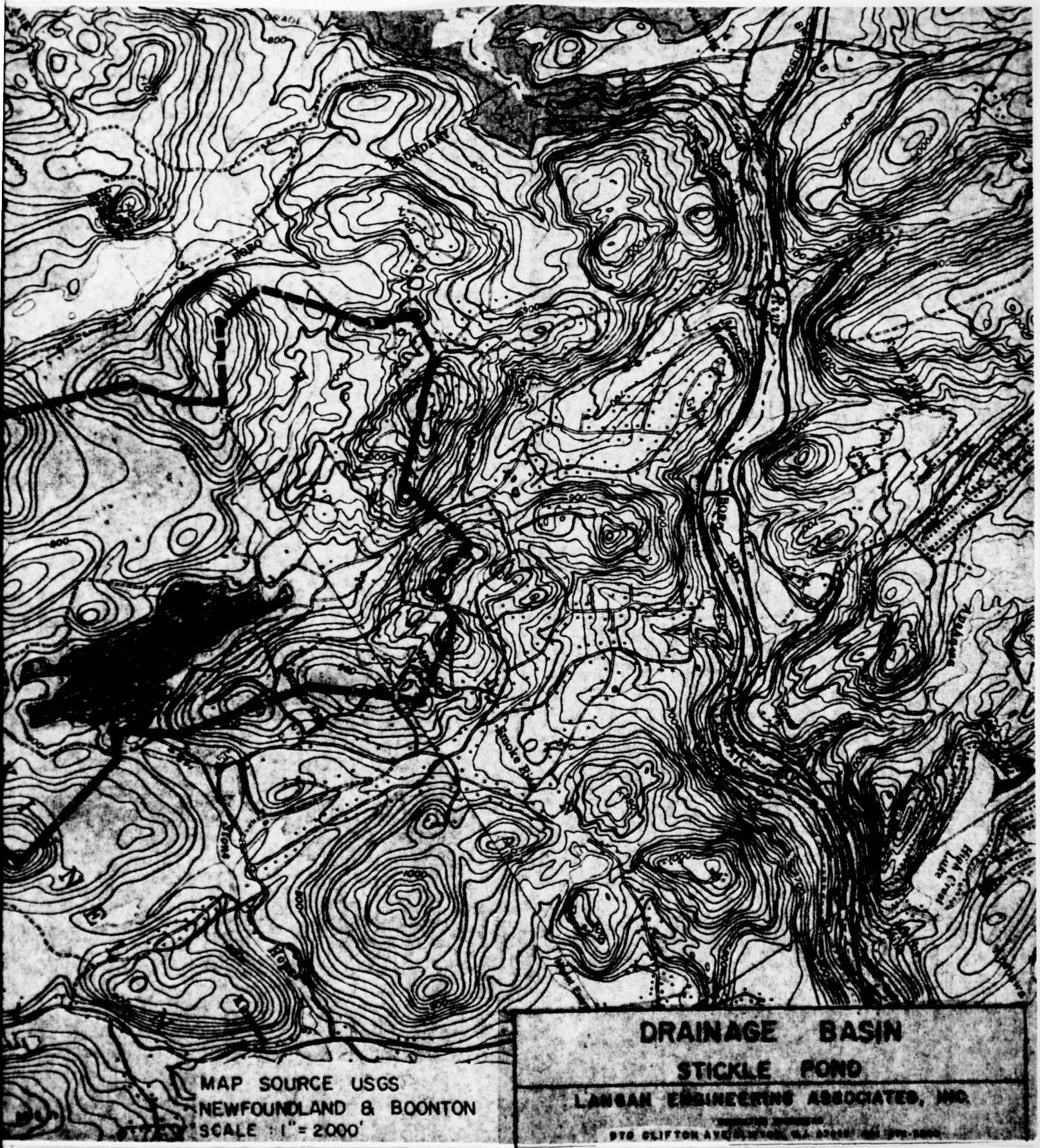
3. OVERTOPPING OCCURS AT EL ≈792.1 (H=0.4') ∴ Q = 51 cfs
   ∴ DAM CAN PASS 2% PMF W/O OVERTOPPING

BY _____ DATE _____ Stickle JOB NO. J-783

CKD GED DATE 8 8 78 SHEET NO. 10 OF 10

Rev 8-15-78


SPLITROCK
RESERVOIR



MAP SOURCE USGS
NEWFOUNDLAND & BOONTON
SCALE : 1" = 2000'

DRAINAGE BASIN
STICKLE POND

LANGAN ENGINEERING ASSOCIATES, INC.

970 CLIFTON AVE. CLIFTON, N.J. 07013 (201) 778-2220

1

2

HEC- 1 OUTPUT

STICKLE POND DAM

```
 listcf stout3 'breakdown'-

STOUT3     16:09 AUG 15,'78

AMDS09 JOB 8294 (LANG0586) IN BREAKDOWN
 CDC1B           LANG0586      8294      FT06F001        14.49.44  15 AUG 78        GED                              GED

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************
                        STICKLE LAKE DAM
                         DETERMINE INFLOW HYDROGRAPH FOR PMF AND .5PMF AND ROUT
                         N.J. DAM INSPECTION

                                                JOB SPECIFICATION
                                  NQ    NHR   NMIN   IDAY    IHR   IMIN METRC   IPLT   IPRT NSTAN
                                  90      0     40      0      0      0      0      0      0      0
                                                      JOPER      NWT
                                                          5        0


                                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                                   NPLAN# 1 NRTIO# 2 LRTIO# 1
                        RTIOS#    1.00    0.50


               **********          **********          **********          **********          **********

                                              SUB-AREA RUNOFF COMPUTATION

                        COMPUTE HYDROGRAPH
                                   ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME
                                       1        0        0        0        0        0        1

                                                    HYDROGRAPH DATA
                      IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                          1       -1     2.63      0.0     2.63     0.80     0.0          0        0        0
```

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	22.50	112.00	123.00	132.00	142.00	0.0	0.0

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.20	0.0	0.0

GIVEN UNIT GRAPH, NUHGQ# 14

125.	401.	593.	538.	359.	203.	144.	93.	58.	41.
25.	16.	8.	5.						

UNIT GRAPH TOTALS 2609. CFS OR 1.03 INCHES OVER THE AREA

RECESSION DATA

STRTQ# -2.00 QRCSN# 0.0 RTIOR# 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
1	0.01	0.00	5.
2	0.01	0.00	5.
3	0.01	0.00	5.
4	0.01	0.00	5.
5	0.01	0.00	5.
6	0.01	0.00	5.
7	0.01	0.00	5.
8	0.01	0.00	5.
9	0.01	0.00	5.
10	0.02	0.00	5.
11	0.02	0.00	5.
12	0.02	0.00	5.
13	0.02	0.00	5.
14	0.02	0.00	5.
15	0.02	0.00	5.
16	0.02	0.00	5.
17	0.02	0.00	5.
18	0.02	0.00	5.
19	0.10	0.00	5.
20	0.12	0.00	5.
21	0.15	0.00	5.
22	0.39	0.00	5.
23	0.14	0.01	6.
24	0.11	0.00	8.
25	0.26	0.12	25.
26	0.26	0.12	73.
27	0.26	0.12	144.
28	0.01	0.00	194.
29	0.01	0.00	188.
30	0.01	0.00	140.
31	0.01	0.00	92.
32	0.01	0.00	59.

33	0.01	0.00	41.
34	0.01	0.00	29.
35	0.01	0.00	20.
36	0.01	0.00	15.
37	0.07	0.00	11.
38	0.07	0.00	9.
39	0.07	0.00	7.
40	0.07	0.00	6.
41	0.07	0.00	5.
42	0.07	0.00	5.
43	0.07	0.00	5.
44	0.07	0.00	5.
45	0.07	0.00	5.
46	0.22	0.09	16.
47	0.22	0.09	51.
48	0.22	0.09	102.
49	0.22	0.09	149.
50	0.22	0.09	180.
51	0.22	0.09	198.
52	0.22	0.09	210.
53	0.22	0.09	218.
54	0.22	0.09	223.
55	1.34	1.21	367.
56	1.61	1.48	854.
57	2.02	1.88	1680.
58	5.11	4.97	2993.
59	1.88	1.75	4617.
60	1.48	1.35	5647.
61	3.37	3.24	5834.
62	3.37	3.24	5954.
63	3.37	3.24	6479.
64	0.11	0.00	6838.
65	0.11	0.00	6023.
66	0.11	0.00	4349.
67	0.11	0.00	2804.
68	0.11	0.00	1753.
69	0.11	0.00	1162.
70	0.11	0.00	738.
71	0.11	0.00	467.
72	0.11	0.00	290.
73	0.0	0.0	171.
74	0.0	0.0	99.
75	0.0	0.0	47.
76	0.0	0.0	21.
77	0.0	0.0	5.
78	0.0	0.0	5.
79	0.0	0.0	5.
80	0.0	0.0	5.
81	0.0	0.0	5.
82	0.0	0.0	5.
83	0.0	0.0	5.

84	0.0	0.0	5.
85	0.0	0.0	5.
86	0.0	0.0	5.
87	0.0	0.0	5.
88	0.0	0.0	5.
89	0.0	0.0	5.
90	0.0	0.0	5.
SUM	29.30	23.54	61806.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6838.	5415.	1682.	687.	61818.
INCHES		19.15	23.80	24.29	24.29
AC-FT		2686.	3338.	3408.	3408.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	6.	8.	25.	73.	144.	194.	188.	140.
92.	59.	41.	29.	20.	15.	11.	9.	7.	6.
5.	5.	5.	5.	5.	16.	51.	102.	149.	180.
198.	210.	218.	223.	367.	854.	1680.	2993.	4617.	5647.
5834.	5954.	6479.	6838.	6023.	4349.	2804.	1753.	1162.	738.
467.	290.	171.	99.	47.	21.	5.	5.	5.	5.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6838.	5415.	1682.	687.	61818.
INCHES		19.15	23.80	24.29	24.29
AC-FT		2686.	3338.	3408.	3408.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	12.	37.	72.	97.	94.	70.
46.	30.	21.	14.	10.	8.	6.	4.	3.	3.
3.	3.	3.	3.	3.	8.	25.	51.	74.	90.
99.	105.	109.	112.	184.	427.	840.	1496.	2308.	2824.
2917.	2977.	3239.	3419.	3011.	2174.	1402.	876.	581.	369.
234.	145.	85.	50.	24.	11.	3.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3419.	2707.	841.	343.	30909.
INCHES		9.58	11.90	12.15	12.15
AC-FT		1343.	1669.	1704.	1704.

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE#	38.	51.	76.	128.	180.	256.	307.	512.	768.	1024.
OUTFLOW#	13.	20.	57.	323.	481.	1000.	1367.	3215.	6171.	9707.

STATION 1, PLAN 1, RTIO 1

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	6.	12.	16.
19.	22.	24.	25.	25.	25.	24.	23.	22.	20.
20.	19.	19.	18.	18.	18.	18.	20.	28.	39.
51.	75.	109.	137.	176.	283.	450.	1016.	2054.	3292.
4474.	5160.	5670.	6147.	6300.	5746.	4699.	3530.	2650.	1974.
1428.	1071.	802.	591.	455.	390.	332.	256.	194.	147.
112.	86.	66.	55.	51.	48.	44.	41.	38.	36.

STOR

0.	1.	1.	1.	1.	2.	2.	2.	3.	3.
3.	3.	4.	4.	4.	5.	5.	5.	6.	6.
6.	6.	7.	7.	8.	11.	17.	26.	36.	44.
49.	52.	54.	55.	55.	54.	54.	53.	52.	51.
50.	50.	49.	48.	47.	47.	48.	51.	57.	64.
72.	80.	86.	92.	99.	120.	170.	258.	383.	519.
621.	680.	725.	766.	777.	731.	640.	539.	449.	374.
314.	266.	227.	196.	171.	150.	131.	115.	103.	94.
87.	82.	78.	75.	72.	70.	67.	65.	63.	62.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6300.	5002.	1669.	675.	60717.
INCHES		17.69	23.61	23.86	23.86
AC-FT		2482.	3312.	3347.	3347.

STATION 1, PLAN 1, RTIO 2

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	2.	5.
6.	7.	8.	8.	8.	8.	8.	8.	8.	8.
8.	7.	7.	7.	7.	7.	7.	8.	10.	12.
14.	17.	19.	26.	35.	56.	198.	395.	781.	1362.
1961.	2353.	2654.	2922.	3039.	2861.	2434.	1919.	1445.	1111.
850.	641.	478.	414.	356.	292.	222.	168.	127.	96.

73.	57.	52.	48.	45.	42.	38.	36.	33.	31.
				STOR					
0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
2.	2.	2.	2.	2.	2.	2.	3.	3.	3.
3.	3.	3.	4.	4.	5.	8.	13.	18.	23.
25.	27.	28.	29.	29.	29.	29.	29.	28.	28.
28.	28.	27.	27.	27.	27.	27.	29.	32.	36.
40.	45.	50.	55.	61.	76.	104.	152.	224.	306.
373.	416.	450.	480.	492.	473.	425.	368.	316.	271.
234.	203.	179.	158.	139.	122.	108.	98.	90.	84.
79.	76.	73.	70.	68.	66.	63.	62.	60.	58.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3039.	2399.	823.	332.	29868.
INCHES		8.48	11.64	11.74	11.74
AC-FT		1190.	1633.	1646.	1646.

********** ********** ********** ********** **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

OPERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS 1.00	0.50
HYDROGRAPH AT	1	1	6838.	3419.
		2	0.	0.
ROUTED TO	1	1	6300.	3039.
		2	0.	0.

```
 listcf stout4 'breakdown'-

STOUT4     16:23 AUG 15,'78

AMDS09 JOB 8292 (LANG0588) IN BREAKDOWN
 CDC1B           LANG0588      8292      FT06F001        14.36.10  15 AUG 78        GED                          GED

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************

*****************************
HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01
*****************************
                        STICKLE LAKE DAM
                         DETERMINE INFLOW HYDROGRAPH FOR PMF AND .5PMF AND ROUT
                         % PMF

                                          JOB SPECIFICATION
                                  NQ    NHR   NMIN   IDAY    IHR   IMIN METRC   IPLT   IPRT NSTAN
                                  90      0     40      0      0      0      0      4      0
                                                    JOPER      NWT
                                                       5        0


                                       MULTI-PLAN ANALYSES TO BE PERFORMED
                                                NPLAN# 1 NRTIO# 6 LRTIO# 1
                                RTIOS#    1.00    0.50    0.40    0.30    0.20    0.10


**********          **********          **********          **********          **********

                                                SUB-AREA RUNOFF COMPUTATION

                                COMPUTE HYDROGRAPH
                                          ISTAQ    ICOMP    IECON    ITAPE     JPLT     JPRT    INAME
                                              1        0        0        0        0        0        1

                                                                HYDROGRAPH DATA
                                     IHYDG     IUHG    TAREA     SNAP    TRSDA    TRSPC    RATIO    ISNOW    ISAME    LOCAL
                                         1       -1     2.63      0.0     2.63     0.80     0.0          0        0        0
```

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	22.50	112.00	123.00	132.00	142.00	0.0	0.0

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	1.00	0.20	0.0	0.0

RECESSION DATA

STRTQ# -2.00 QRCSN# 0.0 RTIOR# 1.00

END-OF-PERIOD FLOW

TIME	RAIN	EXCS	COMP Q
SUM	29.30	23.54	61806.

********** *********** ********** ********* **********

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	0.

STORAGE#	38.	51.	76.	128.	180.	256.	307.	512.	768.	1024.
OUTFLOW#	13.	20.	57.	323.	481.	1000.	1367.	3215.	6171.	9707.

********** *********** ********** ********* **********

PEAK FLOW SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS

OPERATION	STATION	PLAN	RATIOS APPLIED TO FLOWS 1.00	0.50	0.40	0.30	0.20	0.10
HYDROGRAPH AT	1	1	6838.	3419.	2735.	2051.	1368.	684.
		2	0.	0.	0.	0.	0.	0.
ROUTED TO	1	1	6300.	3039.	2416.	1778.	1116.	455.
		2	0.	0.	0.	0.	0.	0.

APPENDIX 5

INVENTORY FORMS 4474 and 4474A

STICKLE POND DAM

PART I – INVENTORY OF DAMS IN THE UNITED STATES

(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

[1] 5

STATE	IDENTITY NUMBER				
1 2	3	4	5	6	7
NJ	0	0	2	8	5

IDENTIFICATION

[2] DIVISION	[3] STATE	[4] COUNTY	[5] CONGR DIST	[6] STATE	[7] COUNTY	[8] CONGR DIST	[9] NAME	[10] LATITUDE (North) ° ′	[11] LONGITUDE (West) ° ′	[12] REPORT DATE DAY MO YR	
8 9 10	11 12	13 14 15	16 17	18 19	20 21 22	23 24	25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61	62 63 64 65 66	67 68 69 70 71 72	73 74 75 76 77 78 79	80
NAT	NJ	027	13				STICKLE POND DAM	40593	074244		0

[13] [14]

IDENTIFICATION (Continued)

POPULAR NAME	NAME OF IMPOUNDMENT	
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43	44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
	STICKLE POND	1

[15] [16] [17] [18] [19] [20]

LOCATION

[15] REGION	[16] BASIN	[17] RIVER OR STREAM	[18] NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	DIST FROM DAM (mi)	POPULATION	
8 9	10 11	12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68	69 70 71	72 73 74 75 76 77 78 79	80
02	03	STONE HOUSE BROOK	KINNELON	2	7600	2

[21] [22] [23] [24] [25] [26] [27] [27A] [27B] [27C] [27D] [27E] [27F]

STATISTICS

TYPE OF DAM	[22] YEAR COMPLETED	[23] PURPOSES	[24] STRUCTURAL HEIGHT (ft)	[25] HYDRAULIC HEIGHT (ft)	[26] IMPOUNDING CAPACITIES MAXIMUM (acre – ft.)	[27] IMPOUNDING CAPACITIES NORMAL (acre – ft.)	[27A] CORPS ENGR. DIST.	[27B] OWN.	[27C] FED. R.	[27D] PRV/FED	[27E] SCS A.	[27F] VERIFICATION DATE DA MO YR	BLANK	
8 9 10 11 12 13 14 15 16 17 18 19	20 21 22 23	24 25 26 27 28 29 30 31 32 33	34 35 36 37	38 39 40	41 42 43 44 45 46 47 48 49	50 51 52 53 54 55 56 57	58 59 60	61	62	63	64	65 66 67 68 69 70 71	72 73 74 75 76 77 78 79	80
PG	1920	R	17	16	1400	1000						05 JUL 78		3

[28]

REMARKS

REMARKS	
8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79	80
21-22-23-24-25-26-27-ESTIMATED	4

FAIC FORM 4674

GENERAL INSTRUCTIONS

form is for use in preparing the inventory of dams in the United States under the requirements of the National Program for nspection of Dams, P L. 92-367. All items of Part I and Part II (Lines 0-9) must be completed as instructed below. Print es distinctly in ink or pencil. For letters o, z, and i, write Ø, Z , and I.

e only one letter or numeral in each space; do not use more letters than blocks allowed for an item. Do not abbreviate on l. Leave one space between words and no space between code letters.

all letter codes or word entries place first letters in left block of field. In word fields any alphabetic, numeric or special acter may be entered. For all numerical entries, use only numerals placing the last digit of number in the right block of including trailing zeros. Do not include a decimal point! In fields where decimals are required values are to be placed around decimal point printed on the form.

e blank those spaces where item does not apply, e.g., do not write "N/A", "-", "None", etc., unless instructed to do so by ific instructions. Use the remarks line when additional space is needed for an item, or to clarify an entry. Preface each remark the item number. (See Item ‖28‖ or ‖56‖ instructions)

PART I

1, ‖1‖ IDENTITY: The Division Engineer will assign and control the identity for dams in the states for which he is respon- . The fust two characters of the identity will be the two-letter state abbreviation in accordance with Federal Information cessing Standards Publication, June 15, 1970 (FIPS PUB 6-1). In cases where a dam is physically located in two or more s, one state will be designated as the principal state for the identity. The last five (5) characters of the identity will be a ential number assigned to identify dams within a state.

LINE 0:

‖2‖ DIVISION: Enter the three (3) letter office symbol for the division making the report in accordance with ABBR ort Code, Appendix B, ER 18-2-1, Civil Works Information System; e.g., NAD, ORD, SWD, etc.

cation:

‖3‖ STATE: Enter two (2) letter principal state abbreviation in accordance with FIPS PUB 6-1.
‖4‖ COUNTY: Enter three (3) digit county identification in accordance with FIPS PUB 6-1.
‖5‖ CONG DIST: Enter one (1) or two (2) digit number for congressional districts in which dam is located.
‖6‖, ‖7‖, and ‖8‖ (Use second location for structures situated in more than one state.)

‖9‖ DAM NAME: Enter official name of dam. Do not abbreviate unless the abbreviation is a part of the official name. dams that do not have a name, create a name by combining the two (2) letter state abbreviation plus "NO NAME" plus a ential number, e.g., if two dams in the State of Alabama do not have names, they would be named as ALNONAME 1 ALNONAME 2.
‖10‖ & ‖11‖ LATITUDE AND LONGITUDE: Enter the latitude and longitude in degrees, minutes and tenths of a minute. eographical location items pertain to dam as its maximum section.
‖12‖ REPORT DATE: Enter the one (1) or two (2) digits for day, the fust three (3) letters of the month and a two (2) year (e.g., 12 JAN74) in which the data has been revised, updated or otherwise changed.

LINE 1:

‖13‖ POPULAR NAME OF DAM: If (other than the official name of the dam) in common use, enter the name in this ace. Leave blank if not applicable.
‖14‖ NAME OF IMPOUNDMENT: Enter official name of lake or reservoir. Leave blank if reservoir does not have a name.

LINE 2

Item ‖15‖ & ‖16‖ REGION AND BASIN: Enter two (2) digit numbers for Region and Basin in accordance with Appendix C, ER 18-2-1, Civil Works Information System.
Item ‖17‖ RIVER OR STREAM: Enter official name of river or stream on which the dam is built. If stream is without name, indicate as tributary to river named; e.g., TR-COLORADO. If off stream, enter name of river plus "OFFSTREAM".
Item ‖18‖ NEAREST DOWNSTREAM CITY-TOWN-VILLAGE: Enter the nearest downstream city-town-village of such size which can be located on a general map.
Item ‖19‖ DISTANCE FROM DAM: Enter distance from dam to nearest downstream city-town-village to the nearest mile.
Item ‖20‖ POPULATION: Enter population of city-town-village given in Item ‖18‖.

LINE 3

Item ‖21‖ TYPE OF DAM: Enter two (2) letter codes, in any order, to describe type of dam.

EARTH	- RL	BUTTRESS	- CB	OTHER	- OT
ROCKFILL	- ER	ARCH	- VA	*(Describe "other" in remarks)*	
GRAVITY	- PG	MULTI-ARCH	- MV		

Item ‖22‖ YEAR COMPLETED: Enter year when the main dam structure was completed and ready for use. If only approximate year can be determined, note this in remarks.
Item ‖23‖ PURPOSES: Enter one (1) letter codes that describe the purposes for which the reservoir is used. The order entered should indicate the relative decreasing importance of the project purposes.

IRRIGATION	- I	NAVIGATION	- N	STOCK OR SMALL FARM POND	- P
HYDROELECTRIC	- H	WATER SUPPLY	- S	DEBRIS CONTROL	- D
FLOOD CONTROL	- C	RECREATION	- R	OTHER	- O
				(Describe "other" in remarks)	

Item ‖24‖ STRUCTURAL HEIGHT: Enter, to the nearest foot, the structural height of the dam which is defined as; the overall *vertical distance from* the lowest point of foundation surface to the top of the dam.
Item ‖25‖ HYDRAULIC HEIGHT: Enter, to the nearest foot, the *hydraulic height of the* dam which is defined as; the effectiv height of the dam with respect to the maximum storage capacity, measured from the natural bed of the stream or watercourse at the downstream toe of the barrier, or if it is not across a stream or watercourse, the height from the lowest elevation of the outside limit of the barrier to the maximum storage elevation.

Impounding Capabilities:

Item ‖26‖ MAXIMUM: Enter the acre feet for maximum storage which is defined as; the total storage space in a reservoir below the maximum attainable water surface elevation, including any surcharge storage.
Item ‖27‖ NORMAL: Enter the acre feet for normal storage which is defined as; the total storage space in a reservoir below the normal retention level, including dead and inactive storage and excluding any flood control or surcharge storage.

Item ‖27A‖ CORPS OF ENGINEERS DISTRICT: Enter the three character Corps of Engineers ABBR report code in which the dam is geographically located, in accordance with Appendix B, ER 19-2-1, Civil Works Information System, e.g., NAN, ORH, SWF, etc.
Item ‖27B‖ OWNERSHIP: Enter N, for Non-Federal; G, for Federal Gov't. Agencies other than the Corps of Engineers; C for Corps of Engineers.
Item ‖27C‖ FEDERALLY REGULATED: Enter N for No; Enter Y for Yes.
Item ‖27D‖ PRIVATE DAMS ON FEDERAL LAND: Enter N for No; Enter Y for Yes.
Item ‖27E‖ ASSISTANCE BY SOIL CONSERVATION SERVICE: Enter N for None; T for Technical Assistance; F for Financial Assistance; B for Both Technical and Financial Assistance.
Item ‖27F‖ VERIFICATION: Date the data was verified as being complete and correct. Enter date as described in Item ‖12‖.

LINE 4

Item ‖28‖ REMARKS: Preface remarks with item number to which it pertains, e.g., 22-ORIGINALLY CONSTRUCTED IN 1928, 23-SETTLING BASIN. *A new line should be used for PART I remarks.*

[1]

PART II – INVENTORY OF DAMS IN THE UNITED STATES

(PURSUANT TO PUBLIC LAW 92-367)

See reverse side for instructions.

STATE	IDENTITY NUMBER
NJ	00128

[29] [30] [31] [32] [33] [34] [35] [36] [37] [38] [39] [40] [41] [42] [43] [44] [45]

STATISTICS

D SMAZ	CREST LENGTH (ft)	SPILLWAY TYPE	SPILLWAY WIDTH (ft)	SPILLWAY MAXIMUM DISCHARGE (cfs)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LOCK 1 LENGTH (ft)	LOCK 1 WIDTH (ft)	LOCK 2 LENGTH (ft)	LOCK 2 WIDTH (ft)	LOCK 3 LENGTH (ft)	LOCK 3 WIDTH (ft)	LOCK 4 LENGTH (ft)	LOCK 4 WIDTH (ft)	BLANK
N	1100	U	22	200	1000												

[46] [47] [48]

MISC DATA

OWNER	ENGINEERING BY	CONSTRUCTION BY
JOHN A TALBOT JR		

[49] [50] [51] [52]

MISC. DATA (Continued)

REGULATORY AGENCY

DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NJ DEP	NJ DEP	NJ DEP	NJ DEP

[53] [54] [55]

MISC. DATA Continued)

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
LANGHAM ENGINEERING ASSOC INC				PL 92 367

[56]

REMARKS

REMARKS

ENG FORM 1 DEC 77 4474A

PART II:

Item [1] IDENTITY: Enter Identity per GENERAL INSTRUCTIONS on PART I.

LINE 5:

Item [29] D/S HAZ: Enter the digit that most closely represents the hazard potential that could occur to the downstream (D/S) area resulting from failure or mis-operation of the dam or facilities.

HAZARD POTENTIAL

CATEGORY	LOSS OF LIFE (Extent of Development)	ECONOMIC LOSS (Extent of Development)
3 = Low	None expected (No permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
2 = Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
1 = High	More than few	Excessive (Extensive community, industry or agriculture)

Item [30] CREST LENGTH: Enter, to the nearest foot, the crest length of the dam which is defined as: the total horizontal distance measured along the axis at the elevation of the top of dam between abutments or ends of dam. Note that this includes spillway width, powerhouse sections, and navigation locks where they form a continuous part of the dam water retaining structure. Detached spillways, locks, and powerhouses shall not be included.

Spillway:

Item [31] TYPE: Enter the one letter code that applies.

CONTROLLED = C UNCONTROLLED = U NONE = N

Item [32] WIDTH: Enter to the nearest foot, the width of the spillway available for discharge when the reservoir is at its maximum designed water surface elevation.
Item [33] MAXIMUM DISCHARGE: Enter the number of cubic feet per second which the spillway is capable of discharging when the reservoir is at its maximum designed water surface elevation.

Volume of Dam:

Item [34] VOLUME OF DAM: Enter the total number of cubic yards occupied by the materials used in the dam structure. If volume of separate materials is known, enter in remarks. Include portions of powerhouses, locks and spillways only if integral with the dam and required for structural stability.

Power Capacity:

Item [35] INSTALLED: Enter installed capacity to one tenth (1/10) Megawatt as of the report date.
Item [36] PROPOSED: Enter the future additional capacity proposed to one tenth (1/10) Megawatt.

Navigation Locks:

Item [37] NUMBER: Enter the number of existing navigation locks for the project.

Item [38] LENGTH: Enter to the nearest foot the length of the navigation lock.

Item [39] WIDTH: Enter to the nearest foot the width of the navigation lock.

Item [40] thru [45] Enter the lengths and widths of additional locks.

LINE 6:

Item [46] OWNER: Enter name of owner. Abbreviate as necessary.
Item [47] ENGINEERING BY: Enter name of organization that engineered the main dam structure. Abbreviate as required.
Item [48] CONSTRUCTION BY: Enter name of construction agency responsible for construction of main structure. Abbreviate as required.

LINE 7:

Regulatory Agency:

Item [49] DESIGN: Enter the name of the organization other than the owner having regulatory or approval authority over the design of the dam. If no organization other than the owner has regulatory or approval authority over the design of the dam indicate NONE.
Item [50] CONSTRUCTION: Enter the name of the organization other than the owner having regulatory authority or inspection responsibilities over the construction of the dam. If no organization other than the owner has regulatory authority or inspection responsibilities over the construction of the dam indicate NONE.
Item [51] OPERATION: Enter the name of the organization other than the owner having regulatory authority, operational control, or surveillance responsibilities over the operation of the dam. If no organization other than the owner has regulatory authority, operational control or surveillance responsibilities over the operation of the dam indicate NONE.
Item [52] MAINTENANCE: Enter the name of the organization other than the owner having regulatory authority or inspection or surveillance responsibilities over the maintenance of the dam. If no organization other than the owner has regulatory authority or inspection or surveillance responsibilities over the maintenance of the dam indicate NONE.

LINE 8:

Inspection:

Item [53] BY: Enter the name of the organization that performed the last safety inspection. Abbreviate as required. If no inspection has been performed enter NONE.
Item [54] DATE: Enter the one (1) or two (2) digits for day, the first three (3) letters of the month and a two (2) digit year when the inspection was performed. If not applicable, leave blank.
Item [55] AUTHORITY FOR INSPECTION: Enter the legislative or regulatory authority for performing the inspection indicated in Item [53], e.g., P.L. 92-367; Div 3, Water Code, State of Calif; ER 1110-2-100; etc.

LINE 9:

Item [56] REMARKS: Preface remarks with the item number to which it pertains. e.g., 34, 500,000 c.y. conc, 475,000 c.y. earthfill. Only one Remarks line should be used for PART II remarks.

APPENDIX 6

REFERENCES

STICKLE POND DAM

APPENDIX 6

REFERENCES

1. Brater, Ernest F. and Kings, Horace W. Handbook of Hydraulics 5th Edition, McGraw-Hill Book Company 1963.

2. Chow, Ven Te, Ph.D, Open Channel Hydraulics, McGraw-Hill Book Company, 1959.

3. Eby, C.F., 1976, Soil Survey of Morris County, New Jersey, U.S. Department of Agriculture, Soil Conservation Service, 111 pp.

4. Lewis, J.V., and H.B. Kummel, 1924, The Geology of New Jersey, Bulletin 14, Geological Survey of New Jersey, Trenton, New Jersey, 146 pp.

5. Lucey, C.S., 1972, Geology of Morris County in Brief, State of New Jersey, Bureau of Geology and Topography, Trenton, New Jersey, 13 pp.

6. Minard, J.P., W.W. Holman, A.R. Jumikis, 1953, Engineering Soil Survey of New Jersey, Report No. 9, Morris County, Rutgers University, New Brunswick, New Jersey, 86 pp.

7. Rogers, F.C., D.R. Lueder, and G.H. Obear, 1951 Engineering Soil Survey of New Jersey, Report No. 3, Passaic County, Rutgers University, New Brunswick, New Jersey, 45 pp.

8. United States Dept. of Agriculture, Soil Conservation Service SCS National Engineering Handbook Section 4 Hydrology NEH-Notice 4-102, August 1972.

9. United States Dept of Agriculture, Soil Conservation Service, Somerset, N.J. Urban Hydrology for Small Watersheds, Technical Release No. 55, January 1975.

10. United States Dept. of Commerce Weather Bureau, April 1956 Hydrometeorological Report No. 33, Washington, D.C.

11. United States Dept. of the Interior, Bureau of Reclamation Design of Small Dams, Second Edition 1973, Revised Print 1977.

12. Widmer, K., 1964, The Geology and Geography of New Jersey, Volume 19, The New Jersey Historical Series, D. Van Nostrand Co., Inc., Princeton, New Jersey, 193 pp.

13. Wolfe, P.E., 1977, The Geology and Landscapes of New Jersey, Crane, Russak & Company, Inc., New York, New York, 351 pp.